This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a **Minor**, **Municipal** permit. The discharge results from the operation of a 0.0395 mgd wastewater treatment plant with a proposed expansion to a design flow tier of 0.0495 mgd. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

1. Facility Name and Mailing Address: The Madeira School, 8328 Georgetown Pike, McLean, VA 22102 — SIC Code: 4952 (WWTP), 8211 (School)

Facility Location: 8328 Georgetown Pike, McLean, VA 22102 — County: Fairfax

Facility Contact Name: Braughn Taylor — Telephone Number: 703-556-8245

2. Permit No.: VA0024121 — Current Expiration Date: 5/7/2008

Other VPDES Permits: VAN010124

Other Permits: Air Registration No. 71828, Waste EPA ID VAD988197919, Petroleum 3008826

E2/E3/E4 Status: N/A

3. Owner Name: The Madeira School

Owner Contact/Title: Braughn Taylor — Telephone Number: 703-556-8245

4. Application Complete Date: January 2, 2008

Permit Drafted By: Anna T. Westernik — Date Drafted: 5/23/2008

Draft Permit Reviewed By: Alison Thompson — Date Reviewed: 6/3/2008

Public Comment Period: Start Date: 10/09/2008 — End Date: 11/07/2008

5. Receiving Waters Information: See **Attachment 1** for the Flow Frequency Determination

Receiving Stream Name: Difficult Run, UT

Drainage Area at Outfalls (Current and Future Outfall 001)	0.0721, 0.0455 square miles	River Mile: (Current and Future Outfall 001)	0.7, 0.2
Stream Basin:	Potomac River	Subbasin:	Potomac
Section:	8	Stream Class:	III
Special Standards:	PWS	Waterbody ID:	VAN-A11R
7Q10 Low Flow:	0.0 mgd	7Q10 High Flow:	0.0 mgd
1Q10 Low Flow:	0.0 mgd	1Q10 High Flow:	0.0 mgd
Harmonic Mean Flow:	0.0 mgd	30Q5 Flow:	0.0 mgd
303(d) Listed:	No	30Q10 Flow:	0.0 mgd
TMDL Approved:	Yes	Date TMDL Approved:	2008

(Benthic for and Bacteriological for Difficult Run)

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

- ✓ State Water Control Law
- ✓ Clean Water Act
- ✓ VPDES Permit Regulation
- ✓ EPA NPDES Regulation
- ___ EPA Guidelines
- ✓ Water Quality Standards (VA and MD)
- ✓ Other (Policy for the Dulles Area Watershed - 9 VAC 400)

7. Licensed Operator Requirements: Class III

8. Reliability Class: Class I

9. Permit Characterization:

✓	Private	✓	Effluent Limited	✓	Possible Interstate Effect (MD)
	Federal	✓	Water Quality Limited	✓	Compliance Schedule Required
	State		Toxics Monitoring Program Required	✓	Interim Limits in Permit
	POTW		Pretreatment Program Required	✓	Interim Limits in Other Document (Consent Order dated 3/17/06)
	TMDL				

10. Wastewater Sources and Treatment Description:

Current 0.0395 mgd Sewage Treatment Plant
Wastewater treatment for the 0.0395 mgd plant consists of a bar screen, primary clarification, trickling filter, secondary clarification, chlorine disinfection, and tablet dechlorination.

Wastewater gravity flows from the school to the plant through a bar screen. From the bar screen, flow enters an Imhoff tank for primary clarification through a junction box to divert the flow to the bottom of the tank. The primary clarifier effluent enters a dosage tank and is then pumped to the rotary distributors of the trickling filters.

The trickling filters are packed with plastic media and covered by a protective shed. Filter effluent then flows through a junction box where sodium hypochlorite is injected into the wastewater as it enters the secondary clarifier for breakpoint chlorination. Return sludge is pumped back to the dosage tank, while wasted sludge is sent to an aerobic digester. Clarified effluent flows through a chorine tablet feeder and then into the chlorine contact chamber. Disinfected effluent flows over a V notch weir where dechlorination takes place via a sodium sulfite liquid feed prior to discharge.

Proposed 0.0395 mdg Sewage Treatment Plant and 0.0495 mgd Sewage Treatment Plant
Wastewater will flow by gravity to a pump station located at the site of the currently operating treatment plant. Raw wastewater will then be pumped via a force main to a sewage treatment plant approximately 1,000 feet from the location of the current sewage treatment plant. Wastewater will flow through a fine, automatic climbing screen used to remove debris and garbage and into an equalization tank. Flow from the equalization tank will be metered at a controlled rate into the aeration basins. The aeration system will consist of several individual cells constructed to operate both in series and parallel. Following activated sludge treatment, the biomass will be settled and returned back to the activated sludge system. Clarified wastewater will be directed to tertiary sand filters for final polishing and routed through ultraviolet disinfection system prior to discharge into an unnamed tributary of Difficult Run. When the design flow is expanded to 0.0495 mgd, filtered water will then be routed through a denitrification filtration unit prior to disinfection. Biosolids will be stored and further treated in two aerobic digesters for final stabilization prior to disposal by a pump and haul contractor.

Description of Receiving Stream
Outfall 001 discharges to an unnamed tributary (UT) of Difficult Run at River Mile 0.7. When the new sewage treatment plant is constructed, Outfall 001 will discharge to the same UT of Difficult Run. However, the outfall will be moved 1,000-1,500 upstream of the current discharge location for Outfall 001. The new discharge point will be at located at 38° 58' 18.6" N; 77° 14' 07.4" W.

The UT appears to be an intermittent storm water and possibly groundwater/spring drainage channel from the Madeira School property. The UT is approximately two feet wide and contains large boulders with a rock and sand streambed. The elevation drops approximately 60 feet as it travels about 400-500 feet to its confluence with Difficult Run.

Difficult Run at the confluence with the UT contains medium to large rocks and has a 50/50 pool to riffle ratio. The pools are approximately 15 inches deep and the riffles are between 6 and 8 inches deep with the channel approximately 20 feet wide under normal conditions. The stream has a mild meander and travels for approximately one quarter mile before discharging to the Potomac River. At the confluence, the Potomac River flows toward the mouth of Difficult Run and then makes a 90 degree turn downstream away from the Run. This causes flow from Difficult Run to sometimes pool, swirl, and backup into the Run at periods of high flow in the Potomac. As a result, the lower reach of the Run may act more like an impoundment than a free flowing stream.

See **Attachment 2** for a facility schematic/diagram.

TABLE 1 Outfall Description				
Outfall Number	**Discharge Sources**	**Treatment**	**Design Flow**	**Outfall Latitude and Longitude**
001	Domestic Wastewater	See Item 10 above.	0.0395 mgd (current)	38° 58' 26" N 77° 14' 10" W
001	Domestic Wastewater	See Item 10 above.	0.0395 mgd (new treatment plant) 0.0495 mgd (expansion)	38° 58' 18.6" N 77° 14' 07.4" W
See **Attachment 3** for Falls Church topographic map (#204D).				

11. Sludge Treatment and Disposal Methods:
All sludge generated by the sewage treatment process is taken to the UOSA WWTP in Centerville, Virginia for treatment. Hauling will occur Monday through Friday from 8:00 a.m. to 5:00 p.m.

12. Discharges, Intakes, Monitoring Stations and Other Items in Vicinity of Discharge

TABLE 2		
Type	**Latitude/Longitude**	**Description**
0.017 mgd Industrial Discharge from a Groundwater Remediation System	38° 55'17", 77° 13' 56"	John Marshall III Site (VA0090093)
Industrial Discharge	38° 57' 54", 77° 20' 15"	Reston Lake Anne Air Conditioning Corporation (VA0091995)
DEQ Monitoring Station 1aDIF000.86	38° 58' 33", 77° 14' 46"	Rt. 193 Bridge

13. Material Storage:

TABLE 3 Material Storage		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Sodium Hypochlorite	275 gallons	Stored under roof
Sodium Bisulfite	200 gallons	Stored under roof
Chlorine tablets	5 buckets	Stored under roof

14. Site Inspection: Performed by Doug Frasier, Terry Nelson, and Daniel Burnstein on February 5, 2008 (see **Attachment 4**).

15. Receiving Stream Water Quality and Water Quality Standards:

a) Ambient Water Quality Data
Outfall 001 discharges to an unnamed tributary of Difficult Run at Rivermile 0.7. When the new facility is constructed, the outfall location will be moved approximately 1,000 to 1,500 feet upstream. However, it will still discharge to an unnamed tributary of Difficult Run. DEQ does not monitor this unnamed tributary. However, impairments have been noted downstream of the discharge in Difficult Run at DEQ monitoring station 1aDIF000.86 located at the Route 193 bridge (see **Attachment 5**, Planning Statement for the Madeira School WWTP).

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2006 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include the *Chesapeake Bay Watershed Nutrient Credit Exchange Program*. This statute set forth total nitrogen and total phosphorus discharge

restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

b) Receiving Stream Water Quality Criteria

Part IX of 9 VAC 25-260 (360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream Difficult Run, UT is located within Section 8 of the Potomac River Basin, and classified as Class III water.

Although Difficult Run is within State Waters of Virginia, the mainstem of the Potomac River is Maryland waters. The current Outfall 001 discharge point is approximately 0.2 miles from the political boundary of Maryland and the discharge has the potential to affect Maryland waters. Title 26, Subtitle 08 of the Code of Maryland Regulations (Maryland Water Quality Criteria) (**Attachment 6**) has been reviewed, and the limitations proposed herein should comply with these regulations.

The Virginia Water Quality Standards state that Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C and must maintain a pH of 6.0-9.0 standard units (S.U.) at all times. Maryland Water Quality criteria state that pH values must be maintained between 6.5 and 8.5 S.U and the dissolved oxygen criteria be not less than 5.0 mg/L at any time.

Attachment 7 details other water quality criteria applicable to the receiving stream.

Ammonia:

The 7Q10 and 1Q10 of the receiving stream are 0.0 mgd. In cases such as this, effluent pH and temperature data may be used to establish the ammonia water quality standard. Staff has re-evaluated the effluent data for pH and temperature and finds the 90th percentile pH value to differ significantly from that used in the previous reissuance (current value is 8.4 S.U.; value used during previous reissuance was 7.5 S.U.) There are no significant differences in the temperature data used to establish ammonia criteria in the previous permit. See **Attachment 8** for the derivation of the 90th percentile values of the effluent pH and temperature data from June 2001 to November 2007. The Virginia ammonia water quality criteria calculations are shown in **Attachment 7**. **Attachment 6** shows the Maryland acute and chronic criteria of 3.88 mg/L and 0.66 mg/L (Salmonids Absent), which is the same as Virginia's ammonia criteria.

Metals:

The 7Q10 of the receiving stream is zero and no ambient data is available. Therefore, the effluent data for hardness can be used to determine the metals criteria. The hardness-dependent metals criteria in **Attachment 6** are based on an average hardness effluent value of 156 mg/L mg/L derived from sampling events conducted from August 2003 though July 2007 (see **Attachment 8**). These criteria are the same of that for the State of Maryland.

Bacteria:

The Virginia Water Quality Standards (9 VAC 25-260-170 B.) states sewage discharges shall be disinfected to achieve the following criteria:

E. coli and enterococci bacteria per 100 ml of water shall not exceed the following:

	Geometric Mean[1]	Single Sample Maximum
Freshwater *E. coli* (N/100 ml)	126	235
Saltwater and Transition Zone[2] enterococci	35	

[1]For two or more samples taken during any calendar month.
[2]See 9 VAC 25-260-140 C for freshwater and transition zone delineation

The Maryland Water Quality Criteria Specific to Designated Uses (Code of Maryland Regulations 26.08.02.03-3.A) states that sewage discharges shall be disinfected to achieve the following criteria:

The single sample maximum allowable density for *E. coli* and enterococci bacteria per 100 ml of water for all areas shall be as follows:

	Geometric Mean[1]	Single Sample Maximum
Freshwater *E. coli* (N/100 ml)	126	235
Freshwater enterococci	33	61
Marine water enterococci	35	104

The Madeira School WWTP discharges to a freshwater zone.

c) Receiving Stream Special Standards
The State Water Control Board's Water Quality Standards, River Basin Section Tables (9 VAC 25-260-360, 370 and 380 designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Difficult Run, UT, is located within Section 8 of the Potomac River Basin. This section has been designated with a special standard of PWS.

Special Standard PWS designates a public water supply intake. The Board's Water Quality Standards establish numerical standards for specific parameters calculated to protect human health from toxic effects through drinking water and fish consumption. See 9 VAC 25-260-140 B for applicable criteria.

d) Policy for Sewage Treatment in the Dulles Area Watershed
Chapter 9 VAC 400 of the State Water Control Law was established to regulate the discharge from sewage treatment plants in the Dulles Area Watershed, which is located upstream of several major public water supply intakes serving the Washington, D.C. metropolitan area. The current outfall discharges and the proposed outfall for the Madeira School WWTP will discharge to the affected area, so this Policy is applicable to this permit issuance.

e) Threatened or Endangered Species
Records of the Virginia DGIF Fish and Wildlife Information System Database were searched to determine if there are threatened or endangered species in the vicinity of the discharge. The following state endangered and threatened species were identified within a two-mile radius of the discharge: the Brook Floater, the Wood Turtle, the Bald Eagle, the Upland Sandpiper, the Migrant Loggerhead Shrike, the Loggerhead Shrike, Henslows Sparrow, and the Appalachian Grizzled Skipper. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and therefore, protect the state endangered and threatened species near the discharge.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed limits are protective of this use.

16. Antidegradation (9 VAC 25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream has been classified as Tier 1 based on an evaluation of flow frequencies. Permit limits proposed have been established by determining wasteload allocations that will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards (WQS) are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. In this case since the critical flows 7Q10 and 1Q10 have been determined to be zero, the WLAs are equal to the WQS. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the

acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. In the case of ammonia evaluations, limits are needed if the 97th percentile of the thirty-day average effluent concentration values is greater than the chronic WLA effluent limitations are based on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a) Effluent Screening

Copper effluent data obtained from the previous permit cycle's discharge monitoring reports (DMRs) has been reviewed and determined to be suitable for evaluation. A wasteload allocation analysis is required for copper. Please see **Attachment 8** for a summary of effluent data.

b) Mixing Zones and Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; 30Q10 for ammonia criteria; and 30Q5 for non-carcinogen human health criteria)
- f = Decimal fraction of critical flow
- C_s = Mean background concentration of parameter in the receiving stream.

The water segment receiving the discharge via Outfall 001 is considered to have a 7Q10 and 1Q10 of 0.0 mgd. As such, there is no mixing zone and the WLA is equal to the C_o.

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this is a WWTP treating sewage, total residual chlorine may be present since chlorine is used for disinfection, and DMR data indicate that copper is present in the discharge. As such, **Attachment 6** details the WLA derivations for these pollutants.

c) Effluent Limitations Toxic Pollutants, Outfall 001

9 VAC 25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation 9 VAC 25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

Staff reevaluated pH and temperature data and has concluded that the pH data is significantly different than that used previously to derive ammonia criteria. As discussed in Part 15.b) of this fact sheet, staff used the new data to determine new ammonia water quality criteria, new wasteload allocations (WLAs) and new ammonia limits (**Attachment 9**). In accordance with current DEQ guidance, staff used a default QL of 0.2 mg/L and a sole data point of 9.0 mg/L for discharges containing domestic sewage to derive limits. It was found that an average monthly limit of 0.90 mg/L and an average weekly limit of 1.3 mg/L for ammonia is needed. These limits replace the monthly and weekly limits of 1.5 mg/L and 2.1 mg/L.

2) Total Residual Chlorine:

Chlorine is used for disinfection and is potentially in the discharge. Staff calculated WLAs for TRC using current critical flows and the mixing allowance. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. A monthly average of 0.008 mg/L and a weekly average limit of 0.010 mg/L are proposed for this discharge (see **Attachment 9**).

3) Metals:

Limits are needed for copper. See **Attachment 9** for derivation of the limits.

d) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants
No changes to the Dissolved Oxygen (D.O.) limitation are proposed. Biochemical Oxygen Demand-5 day (BOD_5), and Total Suspended Solids (TSS) loadings at the 0.0495 mgd design flow tier have been changed from a monthly average of 5.6 kg/day and a weekly average of 8.4 kg/day to a monthly average of 4.5 kg/day and a weekly average of 6.7 kg/day in accordance with the Dulles Policy which states that expansions of existing treatment works may be allowed as long as pollutant quantities or loadings are not increased. The maximum pH concentration has been changed from 9.0 mg/L to 8.5 mg/L to correspondence with the State of Maryland Water Quality Standards.
D.O. and BOD_5, limitations at the 0.0395 mgd design flow tier are based on original modeling conducted on April 8, 1992. Additional modeling was conducted on February 26, 1998 for the 0.0495 mgd facility expansion. The limits for D.O. at the 0.0495 mgd design flow tier were derived using this model and are set to maintain the water quality criteria for D.O. in the receiving stream (see **Attachment 10**).

The limits for Total Suspended Solids are based on the 2008 Benthic TMDL for Difficult Run. The sediment WLA for the Madeira School WWTP in the Benthic TMDL for Difficult Run is 2.25 tons/year (see **Attachment 11** for an excerpt of the TMDL).

pH limitations are set at the Maryland water quality criteria.

On July 14, 2004, *E. coli* limitations were removed from this permit because it was demonstrated that chlorine is an adequate surrogate for. *E. coli*. However, this facility has been assigned a wasteload allocation for *E. coli* in a TMDL for Difficult Run. Additionally, the disinfection of treated wastewater must be confirmed through the addition of an E. coli effluent limitation. Therefore, an *E. coli* limitation has been placed in this permit.

Monitoring for influent Oil and Grease will be required twice per year since a great deal of oil and grease has been found to pass through the treatment system.

e) Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients
VPDES Regulation 9 VAC 25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries.

The State Water Control Board adopted new Water Quality Criteria for the Chesapeake Bay in March 2005.
In addition to the Water Quality Standards, there are three new regulations that necessitate nutrient limitations:

- 9 VAC 25-40 – *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires discharges with design flows of $\geq$0.04 mgd to treat for TN and TP to either BNR levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

- 9 VAC 25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities with design flows of $\geq$0.5 mgd limiting the mass loading from these discharges.

- 9 VAC 25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* was approved by the State Water Control Board on September 6, 2006 and became effective January 1, 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in the 0.0495 mgd design flow tier of this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9 VAC 25-820.70.E.1.

Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in the 0.0495 mgd design flow tier of this individual permit.

For the 0.0495 mgd design flow tier, concentration limits of 8.0 mg/L TN annual average and 1.0 mg/L TP annual average are needed based on 9 VAC 40-70.3.a. The annual loading limits for this facility are 2250 lb. of TN and 301 lb. of TP based on secondary treatment at the 0.0395 mgd design flow tier. Loading limits will be governed by the general permit mentioned above.

f) Effluent Limitations and Monitoring Summary

The effluent limitations are presented in the following table. Limits were established for Flow, pH, BOD_5, Total Suspended Solids, Dissolved Oxygen, Ammonia, *E. coli*, Total Residual Chlorine, Total Phosphorus, Total Nitrogen, and total recoverable copper. Monitoring is included for TKN, Nitrate+Nitrite, and Influent Oil and Grease.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in mgd) and then a conversion factor of 3.785.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual and 9 VAC 25-820-70.E.1 (General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia, Monitoring Requirements).

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19 a) Effluent Limitations/Monitoring Requirements:

Design flow is 0.0395 mgd.

Effective Dates: During the period beginning with the permit's effective date and lasting until the CTO is issued for the 0.0495 mgd facility or the permit expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (mgd)	NA	NL	N/A	N/A	NL	Continuous	TIRE
pH	1, 2	N/A	N/A	6.5 S.U.	8.5 S.U.	1/D	Grab
BOD_5	2, 3	30 mg/L 4.5 kg/day	45 mg/L 6.7 kg/day	N/A	N/A	1/W	4H-C
Total Suspended Solids (TSS)	5	30 mg/L 4.5 kg/day	45 mg/L 6.7 kg/day	N/A	N/A	1/W	4H-C
DO	2, 3	N/A	N/A	6.0 mg/L	N/A	1/D	Grab
Ammonia, as N (mg/L)	2, 3	0.9	1.3	N/A	N/A	1/W	4H-C
E. coli (Geometric Mean)	2, 5	126 n/100mL	N/A	N/A	N/A	2/M	Grab
Total Residual Chlorine (after contact tank)	6	N/A	N/A	1.5 mg/L	N/A	3/D at 4-hr Intervals	Grab
Total Residual Chlorine (after dechlorination)	2	0.008 mg/L	0.010 mg/L	N/A	N/A	1/D	Grab
Copper, Total Recoverable [a]	2	19 µg/L	19 µg/L	N/A	N/A	1/3M	Grab
Influent Oil and Grease	4	N/A	N/A	N/A	NL	2/Y[b]	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Water Quality Standards
3. Stream Model – **Attachment 10**
4. Best Professional Judgment
5. 2008 TMDL for Difficult Run
6. DEQ Disinfection Guidance

mgd = Million gallons per day.
N/A = Not applicable.
NL = No limit; monitor and report.
TIRE = Totalizing, indicating and recording equipment.
S.U. = Standard units.

1/D = Once every day.
1/W = Once every week.
2/M = Twice per month, 7 days apart.
3/D = Three times per day.
1/3M = Once per quarter.
2/Y = Twice per year.

4H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 4-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of four (4) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum four (4) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. See Part I.C of the permit. During the period prior to achieving compliance, sampling shall be conducted during the calendar quarters (Jan - Mar, Apr - Jun, Jul - Sep, Oct - Dec). The results of quarterly sampling shall be received by DEQ-NRO with the DMR on April 10, July 10, October 10, and January 10. Once compliance with the final limits in the permit is obtained as stated in Part I.C of the permit, monitoring shall be conducted at a monthly frequency.

b. One sample is to be collected during Jan-May and another sample is to be collected during Sep-Dec at an interval of at least four weeks apart.

19 b) Effluent Limitations/Monitoring Requirements:

Design flow is 0.0495 mgd.
Effective Dates: During the period beginning with the issuance of the CTO for the 0.0495 mgd facility and lasting until the permit expiration date..

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (mgd)	NA	NL	N/A	N/A	NL	Continuous	TIRE
pH	1, 2	N/A	N/A	6.5 S.U.	8.5 S.U.	1/D	Grab
BOD_5	2, 3, 4	30 mg/L 4.5 kg/day	45 mg/L 6.7 kg/day	N/A	N/A	1/W	8H-C
Total Suspended Solids (TSS)	4, 5, 6	30 mg/L 4.5 kg/day	45 mg/L 6.7 kg/day	N/A	N/A	1/W	8H-C
DO	2, 3	N/A	N/A	6.0 mg/L	N/A	1/D	Grab
Ammonia, as N (mg/L)	2, 3	0.9	1.3	N/A	N/A	1/W	8H-C
E. coli (Geometric Mean)	2, 5	126 n/100mL	N/A	N/A	N/A	2/M	Grab
Total Residual Chlorine (after contact tank)	7	N/A	N/A	1.5 mg/L	N/A	3/D at 4-hr Intervals	Grab
Total Residual Chlorine (after dechlorination)	2	0.008 mg/L	0.010 mg/L	N/A	N/A	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	2, 8	NL mg/L	N/A	N/A	N/A	2/M	8H-C
Nitrate+Nitrite, as N	2, 8	NL mg/L	N/A	N/A	N/A	2/M	8H-C
Total Nitrogen [a.]	2, 8	NL mg/L	N/A	N/A	N/A	2/M	Calculated
Total Nitrogen – Year to Date [b.]	2, 8	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Nitrogen - Calendar Year [b.]	2, 8	8.0 mg/L	N/A	N/A	N/A	1/Y	Calculated
Total Phosphorus	2, 8	NL mg/L	N/A	N/A	N/A	2/M	8H-C
Total Phosphorus – Year to Date [b.]	2, 8	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Phosphorus - Calendar Year [b.]	2, 8	1.0 mg/L	N/A	N/A	N/A	1/Y	Calculated
Copper, Total Recoverable	2	19 µg/L	19 µg/L	N/A	N/A	1/M	Grab
Influent Oil and Grease	5	N/A	N/A	N/A	NL	2/Y	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Water Quality Standards
3. Stream Model – **Attachment 10**
4. 9 VAC 400 (Policy for the Dulles Watershed)
5. Best Professional Judgment
6. 2008 TMDL for Difficult Run
7. DEQ Disinfection Guidance
8. 9 VAC 25-40-70 and 9 VAC 820-10 (Nutrient Regulations)

mgd = Million gallons per day.
N/A = Not applicable.
NL = No limit; monitor and report.
TIRE = Totalizing, indicating and recording equipment.
S.U. = Standard units.

1/D = Once every day.
1/W = Once every week.
2/M = Twice per month, 7 days apart.
3/D = Three times per day.
1/Y = Once every year.
2/Y = Twice per year.

8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight (8) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum eight (8) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite
b. See Part 1.B.4 of the permit for nutrient reporting calculations.
c. One sample is to be collected during Jan-May and another sample is to be collected during Sep-Dec at an interval of at least four weeks apart

20. Other Permit Requirements :

a) Part I.B. of the permit contains additional chlorine monitoring requirements, quantification levels and compliance reporting instructions.
A minimum chlorine residual must be maintained at the exit of the chlorine contact tank to assure adequate disinfection. No more that 10% of the monthly test results for TRC at the exit of the chlorine contact tank shall be <1.0 mg/L with any TRC <0.6 mg/L considered a system failure. *E. coli* limits are defined in this section as well as monitoring requirements to take effect should an alternate means of disinfection be used.

9 VAC 25-31-190.L.4.c requires an arithmetic mean for measurement averaging and 9 VAC 25-31-220.D requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9 VAC 25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9 VAC 25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs since the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

b) Part I.C. of the permit details the requirements for a Schedule of Compliance.

The VPDES Permit Regulation, 9 VAC 25-31-250 allows use of Compliance Schedules to allow facilities sufficient time to meet newly established effluent limits. This permit contains newly established limits for Total Recoverable Copper. Since the facility was not designed to meet these limits, a schedule of compliance is required to provide the permittee time for facility upgrade. The permittee shall achieve compliance with the final limits specified in Part I.A. of the VPDES permit in accordance with the following schedule as contained in Part I.C. of the permit:

Action	Time Frame
1. Submit proposed plan to achieve compliance with final limits.	Within 180 days after the effective date of the permit.
2. Report of progress on attainment of final limits.	An annual progress report must be received by DEQ-NRO on January 10, 2010, January 10, 2011, and January 10, 2012
3. Achieve compliance with final limits.	Within 4 years after the effective date of the permit or when the CTO is issued for the new 0.0395 mgd sewage treatment plant.

21. Other Special Conditions:

a) 95% Capacity Reopener. The VPDES Permit Regulation at 9 VAC 25-31-200.B.2 requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. The facility is a PVOTW.

b) Indirect Dischargers. Required by VPDES Permit Regulation, 9 VAC 25-31-280 B.9 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c) O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9 VAC 25-31-190.E. The permittee shall submit for approval an Operations and Maintenance (O&M) Manual or a statement confirming the accuracy and completeness of the current O&M Manual to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO) by February 10, 2009. Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Noncompliance with the O&M Manual shall be deemed a violation of the permit.

d) CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9 VAC 25-31-200 D, and Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) requires licensure of operators. This facility requires a Class III operator.

f) Sludge Reopener. The VPDES Permit Regulation at 9 VAC 25-31-200.C.4 requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.

g) Sludge Use and Disposal. The VPDES Permit Regulation at 9 VAC 25-31-100.P, 220.B.2, and 420-720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements may be derived from the Biosolids Use Regulations, 12 VAC 5-585-10 et seq.. The facility includes a treatment works treating domestic sewage.

h) Nutrient Offsets. The Virginia General Assembly, in their 2005 session, enacted a new Article 4.02 (Chesapeake Bay Watershed Nutrient Credit Exchange Program) to the Code of Virginia to address nutrient loads to the Bay. Section 62.1-44.19:15 sets forth the requirements for new and expanded dischargers, which are captured by the requirements of the law, including the requirement that non-point load reductions acquired for the purpose of offsetting nutrient discharges be enforced through the individual VPDES permit.

i) E3/E4 9 VAC 25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

j) Nutrient Reopener. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

k) TMDL Reopener: This special condition is to allow the permit to be reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a) Standards
   1) The PWS special standard has been made applicable.
   2) The Dulles Policy had been made applicable due to the presence of a downstream water supply.

b) Special Conditions:
   1) Special Conditions for Nutrient Trading and Offsets and E3/E4 were added.
   2) A TMDL reopener was added.
   3) In accordance with the Dulles Policy, an instream monitoring condition has been added.

c) Monitoring and Effluent Limitations:
   1) The loading limits for BOD_5 and TSS at the 0.0495 mgd tier have changed from a monthly average of 5.6 kg/day and a weekly average of 8.4 kg/day to a monthly average of 4.5 kg/day and a weekly average of 6.7 kg/day in accordance with the Dulles Policy.
   2) The limits for Total Residual Chlorine have been changed from a monthly average of 0.011 mg/L and a weekly average of 0.016 mg/L to a monthly average of 0.008 mg/L and a weekly average of 0.010 mg/L.
   3) The limits for pH have been changed from a minimum and maximum of 6.0 S.U. and 9.0 S.U. to a minimum and maximum of 6.5 S.U. and 8.5 S.U. to correspondence with the State of Maryland Water Quality Standards.
   4) Monitoring and effluent limitations were added for nitrogen (total nitrogen, total nitrogen – year to date, total nitrogen – calendar year) and phosphorus (total phosphorus, total phosphorus – year to date, total phosphorus – calendar year) at the 0.0495 mg design flow tier.
   5) Monitoring, a compliance schedule, and permit limits for copper have been placed in this permit.
   6) All 4H-C monitoring at the 0.0495 mgd has been changed to 8H-C monitoring to maintain consistently with the nutrient monitoring requirements in 9 VAC 25-820-70.E.1 (General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia, Monitoring Requirements).

7) The ammonia limits have been changed from a monthly average of 1.5 mg/L and a weekly average of 2.1 mg/L to a monthly average of 0.9 mg/L and a weekly average of 1.3 mg/L.
8) *E. Coli* limits and a sampling frequency of twice per month have been added.
9) Influent monitoring for Oil and Grease has been added at a frequency of twice per year.

24. Variances/Alternate Limits or Conditions: None

25. Public Notice Information:

First Public Notice Date: 10/08/2008 Second Public Notice Date: 10/15/2008

Public Notice Information is required by 9 VAC 25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: Northern DEQ Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3837, atwesternik@deq.virginia.gov. See **Attachment 12** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):
Although the Madeira School WWTP does not discharge into a 303(d) listed stream segment, the bacteria and benthic (sediment) impairments along Difficult Run (downstream of the discharge) will both include a WLA for the Madeira School facility (VA0024121). These TMDLs were submitted to EPA on 5/1/08 for approval. The WLA for bacteria is 8.62 E+10 cfu/year for *E. coli* bacteria at a design flow of 0.0495 mgd. The TMDL includes a growth factor. This E. coli WLA will be met in the discharge through meeting the *E. coli* limit of 126n/100mL found in this permit. The WLA for sediment is 5.6 kg/day (2.25 tons/year) at a design flow of 0.0495, which will be met in the discharge through meeting the monthly average TSS limit of 5.6 kg/d.

27. Additional Comments:

Previous Board Action(s): The Madeira School WWTP entered into a consent order with DEQ on March 17, 2006. This order is currently in effect and requires that the school complete a sewer line connection to Fairfax County or construct a new sewage treatment plant. In accordance with this consent order, the Madeira School submitted plans and specifications for the construction of a new wastewater treatment plant to DEQ-NRO Office of Wastewater Engineering staff on February 1, 2008. These plans and specifications are currently under review (see **Attachment 13**—Appendix A, Schedule of Compliance for March 17, 2006 Consent Order).

The following is a brief history of other DEQ water quality board actions:

This facility was referred to DEQ enforcement in March 1997. The wastewater treatment plant was upgraded in September 1997 to resolve problems with BOD, ammonia, sludge, and TSS. The upgrade consisted of installing a new trickling filter, a new pumping system, and a reserve break point chlorination system. The case was de-referred in October 1998.

This facility was referred to enforcement in March 2002 due to violations of the limits for BOD, TSS, and ammonia found in their VPDES permit. Repairs were made to the diffusers in the sludge digester, the drain line, and the recirculation pump. The system was monitored for two months and returned to compliance. The case was de-referred in April 2002.

After the case was de-referred in April 2002, violations of chlorine and ammonia (due to operator error) were found in September 2002. Ammonia violations were found in December 2002. Ammonia violations were found in September and November 2003. Violations of ammonia and BOD were found in December 2003. BOD violations were found in January and March 2004. Ammonia violations were present in April and May 2004. The case was referred to enforcement in July 2004

Public Comment: No comments were received during the public notice period.

EPA Checklist: The checklist can be found in **Attachment 12**.

Attachments

Attachment 1	Flow Frequency Determination
Attachment 2 -	Current and Proposed Facility Schematic/Diagrams
Attachment 3	Falls Church Topographic Map – 204D
Attachment 4 -	Site Visit Memorandums
Attachment 5 -	Planning Statement for Madeira School dated December 13, 2008 with March 21, 2008 Amendment
Attachment 6 -	MD Water Quality Criteria
Attachment 7 -	VA Freshwater Water Quality Criteria and Wasteload Allocations
Attachment 8 -	Derivation of 90th Percentile pH and Temperature Values
Attachment 9 -	Derivation of Effluent Limits
Attachment 10 -	Stream Model
Attachment 11 -	Excerpt of TMDL for Difficult Run
Attachment 12	Public Notice
Attachment 13	Appendix A, Schedule of Compliance for Consent Order dated March 17, 2006
Attachment 14-	EPA Checklist

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Water Quality Assessments and Planning
629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination
The Maderia School - #VA0024121

TO: April Young, NRO

FROM: Paul E. Herman, P.E., WQAP

DATE: October 28, 1997

COPIES: Ron Gregory, Charles Martin, File

The Maderia School discharges to an unnamed tributary to Difficult Run in Fairfax County, VA. Stream flow frequencies are required at this site for use by the permit writer in developing effluent limitations for the VPDES permit.

At the discharge point, the receiving stream is a storm drainage channel which drains to Difficult Run. The flow frequencies for storm drainage channels are 0.0 cfs for the 1Q10, 7Q10, 30Q5, high flow 1Q10, high flow 7Q10, and harmonic mean. Flow frequencies have been determined for the perennial Difficult Run and for the Potomac River above Difficult Run.

The USGS and VDEQ have operated a continuous record gage on the Difficult Run near Great Falls, VA (#01646000) since 1935. The gage is located at the Route 193 bridge approximately 0.5 miles upstream of the Maderia School. The flow frequencies for the gage and the point above the Maderia School are presented below. The values at the Maderia School were determined by drainage area proportions and found to be nearly equal to those calculated for the gage.

Difficult Run near Great Falls, VA (#01646000) and above the Maderia School:

Drainage Area at gage = 57.9 mi^2
Drainage Area above School = 58.18 mi^2

1Q10 = 2.3 cfs	High Flow 1Q10 = 11 cfs
7Q10 = 2.9 cfs	High Flow 7Q10 = 14 cfs
30Q5 = 7.7 cfs	HM = 23 cfs

The high flow months are January through June.

Attachment 1

Flow frequencies were also requested for the Potomac River above Difficult Run. The USGS has operated a continuous record gage on the Potomac River near Washington, D.C. since 1930. The gage is located above Little Falls Dam. The flow frequencies for the gage and the point above Difficult Run are presented below. The values above Difficult Run were determined by drainage area proportions and do not address any withdrawals, discharges, or springs lying between the gage and Difficult Run.

Potomac River near Washington, D.C. (#01646500):

Drainage Area = 11,560 mi^2

1Q10 = 542 cfs	High Flow 1Q10 = 1,913 cfs
7Q10 = 639 cfs	High Flow 7Q10 = 2,273 cfs
30Q5 = 1,096 cfs	HM = 3,823 cfs

Potomac River above Difficult Run:

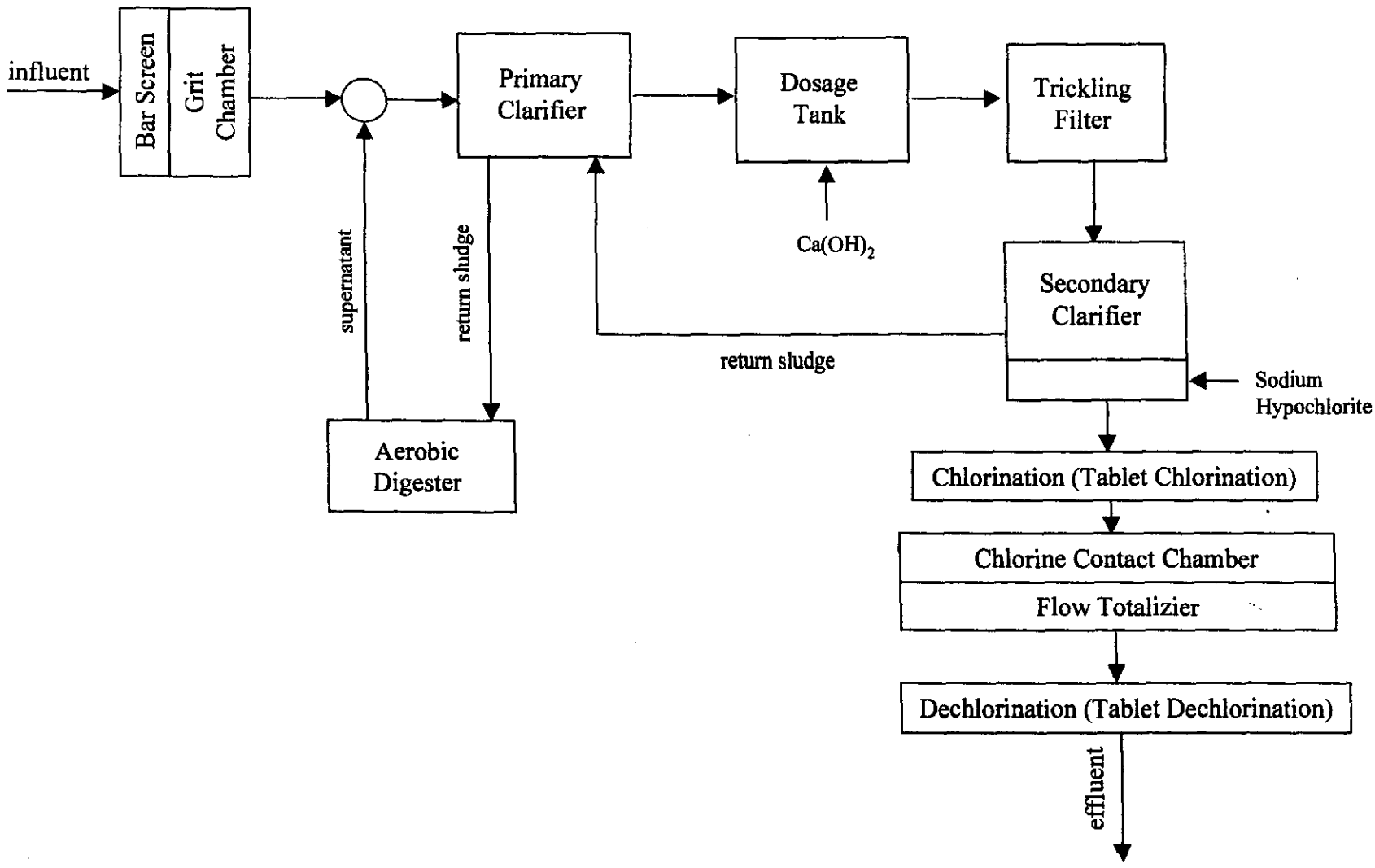
Drainage Area = 11,494.63 mi^2

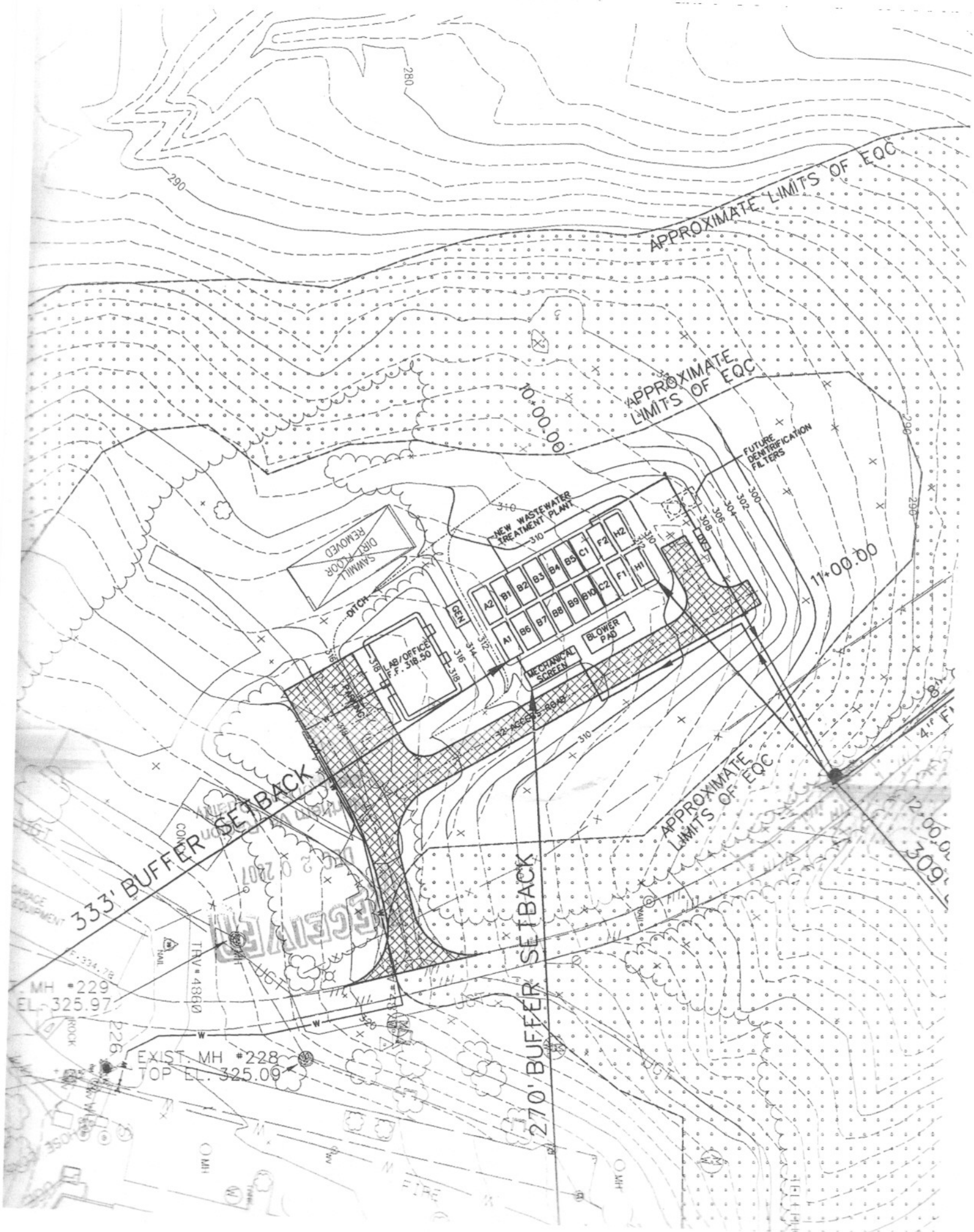
1Q10 = 539 cfs	High Flow 1Q10 = 1,902 cfs
7Q10 = 635 cfs	High Flow 7Q10 = 2,260 cfs
30Q5 = 1,090 cfs	HM = 3,801 cfs

The high flow months are January through May.

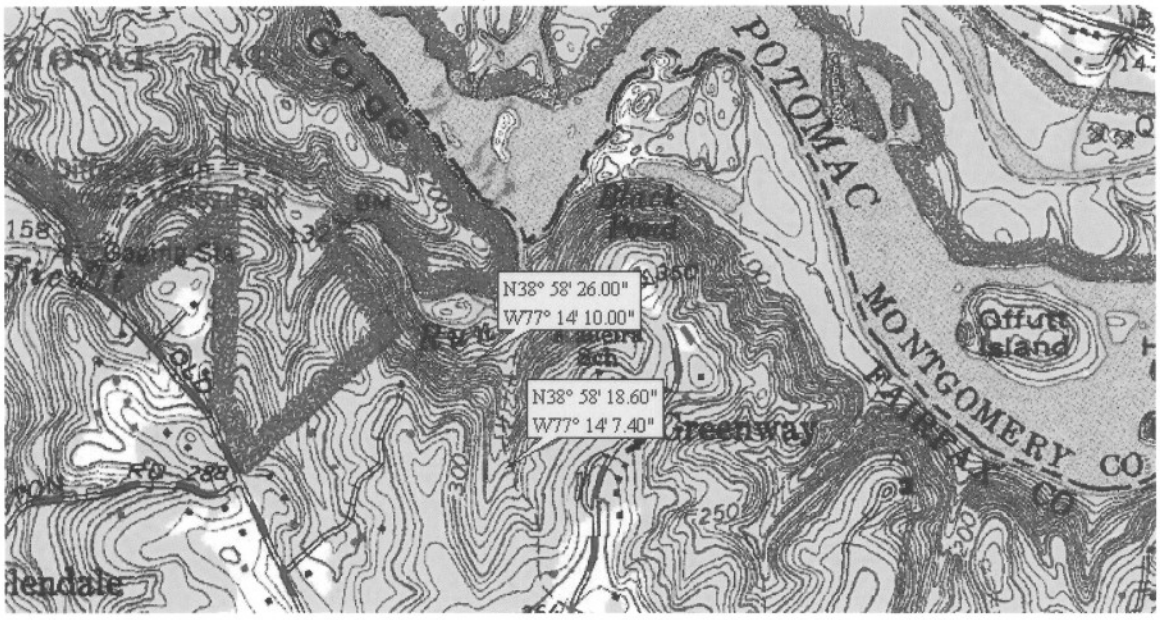
If you have any questions concerning this analysis, please let me know.

Flow Diagram of The Madeira School WWTP




APPROXIMATE LIMITS OF EQC
APPROXIMATE LIMITS OF EQC
APPROXIMATE LIMITS OF EQC
10+00.00
11+00.00
12+00.00
NEW WASTEWATER TREATMENT PLANT
FUTURE DENITRIFICATION FILTERS
SAWMILL DIRT FLOOR REMOVED
DITCH
LAB/OFFICE F.F. 318.50
GEN
BLOWER PAD
MECHANICAL SCREEN
A2
B1
B2
B3
B4
B5
C1
F2
H2
A1
B6
B7
B8
B9
B10
C2
F1
H1
32' ACCESS ROAD
333' BUFFER SETBACK
270' BUFFER SETBACK
MH #229
EL. 325.97
EXIST. MH #228
TOP EL. 325.09
TRV = 4360
280
290
300
302
304
306
310
312
314
316
318
320

Locations of the Madeira School STP Current and Proposed Outfalls 001



Attachment 3

Attachment 4

MEMORANDUM

TO: Permit File

FROM: Douglas Frasier

DATE: 15 February 2008

SUBJECT: Site Visit – Madeira School STP – VA0024121

Dan Burstein, Terry Nelson and I met with ESS and Madeira School staff at the Madeira School STP on 6 February 2008 as part of the permit reissuance. Don Hearl, Rebecca Johnson and Dave Campbell from ESS and Ed Hamer and Bob Vogel with the school provided a brief tour of the facility. The facility is located below the school grounds situated close to the Potomac River.

Sewage influent flows via gravity from the collection system to the headworks of the sewage treatment plant. Preliminary treatment at the headworks consists of solids removal through a manual barscreen. There was a considerable amount of grease accumulated on the barscreen. Don explained that in order to reduce the amount of refuse from the kitchens, the school had installed disposal units for the food scraps. ESS is in the process of determining the amount of grease that could be expected from the kitchen area while the new plant is under final design. The testing will cease (disposal units will not be used) if the effluent BOD and TSS concentrations begin to approach the current permit limitation.

From the barscreen, flow enters the primary clarifier (Imhoff tank) through a junction box. The primary clarifier effluent enters a dosage tank and is then pumped to the trickling filter. The media for the trickling filter was covered with a greasy, gray coating; quite evident of the amount of grease entering the system. Filter effluent then flows through a junction box where sodium hypochlorite is injected as it flows to the secondary clarifier for breakpoint chlorination. Clarified effluent is disinfected through a chlorine tablet feeder, chlorine contact tank and finally dechlorinated via a sodium sulfite liquid feed.

The new plant will be designed to handle the amount of oil and grease from the disposal units from the cafeterias. The barscreen of the old plant will be replaced with a pump station. The new plant will be located behind the maintenance barn, up hill from the existing plant. The outfall will be relocated to ensure visibility and accessibility by plant personnel. The current location is approximately 1000 – 1500 feet upstream of the current outfall location (coordinates are: 38° 58' 18.6" N; 77° 14' 07.4" W). Construction is expected to begin March 2009.

Chemicals on site:

Sodium Hypochlorite	275 gallons	under roof
Sodium Bisulfite	200 gallons	under roof
Chlorine tablets	5 buckets	under roof

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

Northern Regional Office

TO: Permits File

FROM: Terry Nelson

DATE: February 6, 2008

SUBJECT: Madeira School STP, VA0024121

On February 5, 2008; Doug Frasier, Dan Burstein, and I met with staff from ESS and Madeira School regarding the upcoming permit re-issuance. ESS was represented by Don Hearl, Rebecca Johnson, and Dave Campbell. Madeira School staff was Ed Hamer and Bob Vogel. The STP equipment includes bar screen, primary clarifier/Imhoff tank, tricking filter, secondary clarifier, chlorination, and dechlorination. Accumulated grease was noticed at the bar screen. According to Don, the new plant currently under design should be able to handle grease so ESS is trying to determine typical influent values if the school kitchen allows grease and food scraps to be discharged to the treatment plant. If the effluent BOD or TSS concentrations start to approach effluent limits, the influent testing would be suspended or stopped. The effects of grease were evident in the primary clarifier and trickling filter. The media for the trickling filter was covered with a greasy, gray coating. No problems were noted with the effluent. Depending on the expected time prior to the new plant, ESS and Madeira School may need to upgrade/replace the grates and associated grate support beams, which are showing signs of significant corrosion.

Don did mention the possibility of moving the outfall for the new plant. While leaving the current plant, we stopped at a spot that ESS and Madeira School staffs think would be a good outfall location. Bob Vogel said the site has steady flow from a spring that continued flowing even during the past summer. Doug Frasier, Don, Bob, and I walked the area and recorded GPS co-ordinates at one location. There appear to be 2 main reasons for moving the outfall; 1) the new plant would be located uphill from the current plant, and 2) the current outfall presents safety hazards during wet and icy weather. Since the current plant would be converted to a pump station, visual observations of the current outfall location would be possible.

Attachment 5

To: Rob Swanson
From: Anna Westernik

Date: December 13, 2007
Subject: Planning Statement for the Madeira School WWTP (VA0024121)

Discharge Type: Municipal
Discharge Flow: 0.0395 MGD with a proposed expansion to 0.0495 MGD

Receiving Stream: Difficult Run, UT
Latitude / Longitude: 38° 58' 26"
77° 14' 10"

Watershed: VA95 = VAN-A11R, NWBD = PL22

1. Is there monitoring data for the receiving stream? No.
   - If yes, please attach latest summary. NA
   - If no, where is the nearest downstream monitoring station.
   There are no downstream monitoring stations in Virginia, as the facility outfall is located very near to the confluence of Difficult Run with the Potomac River.

2. Is the receiving stream on the current 303(d) list? No.

   - If yes, what is the impairment? NA

   - Has the TMDL been prepared? NA

   - If yes, what is the WLA for the discharge? NA

   - If no, what is the schedule for the TMDL? NA

3. If the answer to (2) above is no, is there a downstream 303(d) listed impairment? Yes.

   - If yes, what is the impairment?
   The facility discharges to an unnamed tributary to Difficult Run. The most downstream portion of Difficult Run is monitored at the Route 193 bridge crossing (station 1aDIF000.86). This station, however, is upstream from the confluence of Difficult Run and the unnamed tributary to Difficult Run to which the facility discharges. The most downstream portion of Difficult Run, which begins at the confluence with Captain Hickory Run, approximately 0.6 rivermile upstream from Route 683, and continues downstream approximately 2.93 rivermiles until the confluence with the Potomac River, is noted with four impairments and an observed effect. The impairments are for *E. coli* bacteria, benthic macroinvertebrates, and heptachlor epoxide and polychlorinated biphenyls (PCBs) in fish tissue. There is also an observed effect for mercury in fish tissue.

A summary of the assessment unit (VAN-A11R_DIF01A00) is noted below:

Class III, Section 8, special stds. PWS.

DEQ ambient, biological, and fish tissue/sediment monitoring station 1ADIF000.86, at Route 193.

Historical Note: This segment was included in Attachment A, Category 1, Part 1 of Virginia's 1998 Part 1A submittal for benthics. This segment was included in Attachment B of the 1999 Consent Decree (Plaintiff's list of waters) for fecal coliform. It was found to be fully supporting of the recreation use in the 2002 305(b) water quality assessment. However, with the lower fecal coliform bacteria criteria, it is assessed as not supporting the recreation use for the 2004 water quality assessment. Only the benthic impairment is subject to the consent decree schedule.

Historical Note: In 2006, a twenty-year trend analysis was performed on data from station 1ADIF000.86. While no applicable uses were shown to be threatened, the following statistically significant trends were observed; Total Nitrogen (increasing) and Total Kjeldahl Nitrogen (increasing).

Historical Note: In 1999, the Mn concentrations exceeded the water quality taste and odor criteria in one of one sample. However, the Mn standard now is only applicable directly at the water intake.

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 12/13/04, limits American eel consumption to no more than two meals per month. The affected area includes the following tributaries in the Potomac River basin between the VA/MD state line near the Route 340 bridge (Loudoun County) to the I-395 bridge (Arlington County); Goose Creek up to the Dulles Greenway Road Bridge, Broad Run up to the Route 625 bridge, Difficult Run up to the Route 7 bridge, and Pimmit Run up to the Route 309 bridge. **Additionally, fish tissue data revealed an exceedance of the water quality criterion based tissue value (TV) of 54 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in 2001 and of 12 ppb for heptachlor epoxide in 2001 and 2004.** *Finally, there was an exceedance of the risk-based tissue screening value (TSV) of 300 ppb for mercury in 2004.* All of these exceedances were found in American eel.

E.coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. DEQ benthic macroinvertebrate biological monitoring finds this segment to be moderately impaired, resulting in an impaired classification of the aquatic life use. The public water supply and wildlife uses are considered fully supporting.

2004 TMDL ID for this segment was VAN-A11R-01. Segment was formerly identified with a bacterial impairment due to exceedances of the fecal coliform criterion, which is no longer applicable to this reach, as at least twelve E.coli samples have been collected.

- Has a TMDL been prepared? No.

- Will the TMDL include the receiving stream?
While the receiving stream will not be included, as it is not listed, the applicable TMDL will consider all upstream facilities.

- Is there a WLA for the discharge?
No, as no TMDLs have been completed at this time.

- What is the schedule for the TMDL?
The *E. coli* bacteria and benthic macroinvertebrate TMDLs are expected to be completed and submitted to EPA by May 1, 2008. The heptachlor epoxide and PCB TMDLs both have a due date of 2018.

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?
   There is no additional monitoring that is requested by planning/assessment staff at this time.

5. Could you please calculate the drainage area at the outfall?
   The approximate drainage area above the outfall is 0.0721 square miles (46.14 acres), assuming that the outfall location is corrected slightly to 38° 58' 25.99", -77° 14' 8.57".

Attachment 6

.03-3 Water Quality Criteria Specific to Designated Uses.

A. Criteria for Use I Waters—Water Contact Recreation and Protection of Nontidal Warmwater Aquatic Life.

(1) Bacteriological.

(a) Table 1. Bacteria Indicator Criteria for Frequency of Use.

Steady State Geometric Mean Indicator Density		Single Sample Maximum Allowable Density			
Indicator	All Areas	Frequent Full Body Contact Recreation (Upper 75% CL)	Moderately Frequent Full Body Contact Recreation (Upper 82% CL)	Occasional Full Body Contact Recreation (Upper 90% CL)	Infrequent Full Body Contact Recreation (Upper 95% CL)
Freshwater (Either apply)					
Enterococci	33	61	78	107	151
E. coli	126	235	298	410	576
Marine water					
Enterococci	35	104	158	275	500

CL = confidence level

All numbers are counts per 100 milliliters

(b) In freshwater for E. coli, the following formula is used to calculate the upper 75 percent confidence interval for single sample maximum allowable density: antilog[(log 126) + 0.675 * log(SD)].

(c) In freshwater for enterococci, the following formula is used to calculate the upper 75 percent confidence interval for single sample maximum allowable density: antilog[(log 33) + 0.675 * log(SD)], where log(SD) is the standard deviation of the log transformed E. coli or enterococci data. If the site data are insufficient to establish a log standard deviation, then 0.4 is used as the log standard deviation for both indicators. At the default log standard deviation, the values are 235 for E. coli and 61 for enterococci.

(d) In saltwater, for enterococci, the following formula is used to calculate the upper 75 percent confidence interval for single sample maximum allowable density: antilog[(log 35) + 0.675 * log(SD)], where log(SD) is the standard deviation of the log transformed enterococci data. If the site data are insufficient to establish a log standard deviation, then 0.7 is used as the log standard deviation. At the default log standard deviation, the value is 104.

(e) Confidence Level Factors.

(i) The factors in Table 2 are used in the formulas in this subsection to calculate the appropriate confidence limits when site-specific standard deviations are used.

(ii) Table 2.

Confidence Level	Factor
75%	0.675

82%	0.935
90%	1.280
95%	1.650

(f) Establishment of a Site-Specific Standard Deviation. A site-specific standard deviation for use in the formulas in this subsection shall be based on at least 30 samples, taken over not more than one recreational season, at base flows.

(g) When a sanitary survey and an epidemiological study approved by the Department disclose no significant health hazard, the criteria in Table 1 do not apply.

(2) Dissolved Oxygen. The dissolved oxygen concentration may not be less than 5 milligrams/liter at any time.

(3) Temperature.

(a) The maximum temperature outside the mixing zone determined in accordance with Regulation .05 of this chapter or COMAR 26.08.03.03 —.05 may not exceed 90°F (32°C) or the ambient temperature of the surface surface waters, whichever is greater.

(b) A thermal barrier that adversely affects aquatic life may not be established.

(c) Ambient temperature is the water temperature that is not impacted by a point source discharge.

(d) Ambient temperature shall be measured in areas of the stream representative of typical or average conditions of the stream segment in question.

(e) The Department may determine specific temperature measurement methods, times, and locations.

(4) pH. Normal pH values may not be less than 6.5 or greater than 8.5.

(5) Turbidity.

(a) Turbidity may not exceed levels detrimental to aquatic life.

(b) Turbidity in the surface water resulting from any discharge may not exceed 150 units at any time or 50 units as a monthly average. Units shall be measured in Nephelometer Turbidity Units.

(6) Color. Color in the surface water may not exceed 75 units as a monthly average. Units shall be measured in Platinum Cobalt Units.

(7) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms apply in waters designated as fresh water in Regulation .03-1B;

(b) Estuarine or salt water aquatic organisms apply in waters designated as estuarine or salt waters as specified in Regulation .03-1B; and

(c) The wholesomeness of fish for human consumption apply in fresh, estuarine, and salt waters.

B. Criteria for Subcategory Use I-P Waters—Water Contact Recreation, Protection of Nontidal Warmwater Aquatic Life and Public Water Supply. The following criteria apply:

(1) The criteria for Use I waters in §A(1)—(5); and

(2) Toxic Substance Criteria. All toxic substance criteria:

(a) For protection of fresh water aquatic organisms apply; and

(b) To protect public water supplies and the wholesomeness of fish for human consumption apply.

C. Criteria for Use II Waters—Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting.

(1) Bacteriological Criteria. These criteria are the same as for Use I, criteria for protection of recreational use, except, in Shellfish Harvest Waters, the following criteria also apply. In Shellfish Harvest waters, there may not be any pathogenic or harmful organisms in sufficient quantities to constitute a public health hazard in the use of waters for shellfish harvesting. A public health hazard for the consumption of raw shellfish will be presumed:

(a) If the most probable number (MPN) of fecal coliform organisms exceeds a median concentration of 14 MPN per 100 milliliters;

(b) If more than 10 percent of samples taken exceed 43 MPN per 100 milliliters for a 5-tube decimal dilution test or 49 per 100 milliliters for a 3-tube decimal dilution test; or

(c) Except when a sanitary survey approved by the Department of the Environment discloses no significant health hazard, §C(1)(a) and (b) do not apply and a public health hazard from the consumption of shellfish will not be presumed.

(2) Classification of Use II Waters for Harvesting.

(a) Approved classification means that the median fecal coliform MPN of at least 30 water sample results taken over a 3-year period to incorporate inter-annual variability does not exceed 14 per 100 milliliters; and:

(i) In areas affected by point source discharges, not more than 10 percent of the samples exceed an MPN of 43 per 100 milliliters for a five tube decimal dilution test or 49 MPN per 100 milliliters for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results does not exceed an MPN of 43 per 100 milliliters for a five tube decimal dilution test or 49 MPN per 100 milliliters for a three tube decimal dilution test.

(b) Conditionally approved classification means that the Department has determined that under certain conditions an area is restricted, but when not restricted, meets the conditions for the approved classification.

(c) Restricted classification means that the median fecal coliform MPN of at least 30 water sample results taken over a 3-year period does not exceed 88 per 100 milliliters or that the Department has determined that a public health hazard exists; and:

(i) In areas affected by point source discharges, not more than 10 percent of the samples exceed an MPN of 260 per 100 milliliters for a five tube decimal dilution test or 300 MPN per 100 milliliters for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results does not exceed an MPN of 260 per 100 milliliters for a five tube decimal dilution test or 300 MPN per 100 milliliter for a three tube decimal dilution test.

(d) Prohibited classification means that the fecal coliform values exceed those required for the restricted classification or is an area designated by the Department as a closed safety zone adjacent to a sewage treatment facility outfall or is an area closed due to a known pollution source.

(3) Temperature—same as Use I waters.

(4) pH—same as Use I waters.

(5) Turbidity—same as Use I waters.

(6) Color—same as Use I waters.

(7) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Estuarine or salt water aquatic organisms apply in accordance with the requirements of Regulation .03-1B; and

(b) The wholesomeness of fish for human consumption apply.

(8) Dissolved Oxygen Criteria for Use II Waters.

(a) This criteria is the same as for Use I waters, except for the Chesapeake Bay mainstem and associated tidal tributary subcategories.

(b) Seasonal and Migratory Fish Spawning and Nursery Subcategory. The dissolved oxygen concentrations in areas designated as migratory spawning and nursery seasonal use shall be:

(i) Greater than or equal to 6 milligrams/liter for a 7-day averaging period from February 1 through May 31;

(ii) Greater than or equal to 5 milligrams/liter as an instantaneous minimum from February 1 through May 31; and

(iii) Applicable to the open-water fish and shellfish subcategory criteria from June 1 to January 31.

(c) The seasonal shallow-water submerged aquatic vegetation subcategory is the same as for the open-water fish and shellfish subcategory year-round.

(d) Open-Water Fish and Shellfish Subcategory. The dissolved oxygen concentrations in areas designated as open-water fish and shellfish subcategory shall be:

(i) Greater than or equal to 5.5 milligrams/liter for a 30-day averaging period year-round in tidal fresh waters (salinity less than or equal to 0.5 parts per thousand);

(ii) Greater than or equal to 5 milligrams/liter for a 30-day averaging period year-round (salinity greater than 0.5 parts per thousand);

(iii) Greater than or equal to 4.0 milligrams/liter for a 7-day averaging period year-round;

(iv) Greater than or equal to 3.2 milligrams/liter as an instantaneous minimum year-round; and

(v) For protection of the endangered shortnose sturgeon, greater than or equal to 4.3 milligrams/liter as an instantaneous minimum at water column temperatures greater than 29°C (77°F).

(e) Seasonal Deep-Water Fish and Shellfish Subcategory. The dissolved oxygen concentrations in areas designated as seasonal deep-water fish and shellfish subcategory shall be:

(i) Greater than or equal to 3.0 milligrams/liter for a 30-day averaging period from June 1 through September 30;
(ii) Greater than or equal to 2.3 milligrams/liter for a 1-day averaging period from June 1 through September 30;

(iii) Greater than or equal to 1.7 milligrams/liter as an instantaneous minimum from June 1 through September 30;

(iv) The open-water fish and shellfish subcategory criteria apply from October 1 to May 31;

(v) For the dissolved oxygen criteria restoration variance for Chesapeake Bay Mainstem Segment 4 mesohaline (CB4MH) seasonal deep-water fish and shellfish subcategory, not lower for dissolved oxygen in segment CB4MH than the stated criteria for the seasonal deep-water seasonal fish and shellfish use for more than 7 percent spatially and temporally (in combination), from June 1 to September 30; and

(vi) For dissolved oxygen criteria restoration variance for Patapsco River mesohaline (PATMH) seasonal deep-water fish and shellfish subcategory, not lower for dissolved oxygen in segment PATMH than the stated criteria for the deep-water seasonal fish and shellfish use for more than 7 percent spatially and temporally (in combination), from June 1 to September 30.

(f) Seasonal Deep-Channel Refuge Subcategory. The dissolved oxygen concentrations in areas designated as deep-channel seasonal refuge use shall be:

(i) Greater than or equal to 1.0 milligrams/liter as an instantaneous minimum from June 1 through September 30 except for Chesapeake Bay segments subject to variances;

(ii) For dissolved oxygen criteria restoration variance for Chesapeake Bay Mainstem Segment 4 mesohaline (CB4MH) deep-channel refuge subcategory, not lower for dissolved oxygen in segment CB4MH than the stated criteria for the seasonal deep-channel refuge for more than 2 percent spatially or temporally (in combination), from June 1 to September

30; and

(iii) The same as for the open-water fish and shellfish subcategory from October 1 to May 31.

(g) Implementation of the Dissolved Oxygen Water Quality Standard. The attainment of the dissolved oxygen criteria that apply to the Chesapeake Bay and tidally influenced tributary waters shall be determined consistent with the guidelines established in the 2003 U.S. Environmental Protection Agency publication "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries (EPA 903-R-03-002)" and the "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries—2004 Addendum (EPA 903-R-04-005)" which are incorporated by reference.

(h) Restoration Variance. The percentage of allowable exceedance for restoration variances is based on water quality modeling and incorporates the best available data and assumptions. The restoration variances are temporary, and will be reviewed at a minimum every three years, as required by the Clean Water Act and EPA regulations. The variances may be modified based on new data or assumptions incorporated into the water quality model.

(9) Water Clarity Criteria for Seasonal Shallow-Water Submerged Aquatic Vegetation Subcategory.

(a) Water Clarity Criteria Measurement. The attainment of the water clarity criteria for a given Bay segment can be determined using any of the following methods:

(i) Shallow-water acreage meets or exceeds the percent-light-through-water (PLW) criteria expressed in Secchi depth equivalence (Table 1) at the segment specific application depth specified in Regulation .08 of this chapter (excludes no grow zones);

(ii) Submerged aquatic vegetation (SAV) acreage meets or exceeds the acreage restoration goal (Table 2); or

(iii) Shallow-water acreage meeting or exceeding the Secchi depth requirements in combination with actual SAV acreage equal or exceed the SAV restoration goal acreage.

(b) Table 1. Numerical Water Clarity Criteria (in Secchi Depth Equivalents) for General Application to Shallow Water Aquatic Vegetation Bay Grass Designated Use (Application Depths Given in 0.5 Meter Attainment Intervals[1]).

Salinity Regime	Water Clarity Criteria	Water Clarity Criteria as Secchi Depth (meters)				Seasonal Application
		Water Clarity Criteria Application Depths (meters)				
	as Percent Light through Water	0.5	1.0	1.5	2.0	
		Secchi Depth Equivalents for Criteria Application Depth				
Tidal Fresh	13%	0.4	0.7	1.1	1.4	April 1 to October 1
Oligohaline	13%	0.4	0.7	1.1	1.4	April 1 to October 1
Mesohaline	22%	0.5	1.0	1.4	1.9	April 1 to October 1

[1]Based on application f the formula PLW = $100\exp(-K_dZ)$, the appropriate PLW criterion value and the selected application depth (Z) are inserted and the equation is solved for K_d. The generated K_d value is then converted to Secchi depth (in meters) using the conversion factor $K_d = 1.45/\text{Secchi depth}$.

(c) Table 2. SAV Acreage Restoration Goals.

Segment Description[1]	Segment Designator	SAV Acreage Restoration Goal	Secchi Application Depth
Northern Chesapeake Bay	CB1TF2	12,149	2 meters
Northern Chesapeake Bay	CB1TF1	754	1.0 meters
Lower Pocomoke River Mesohaline	POCMH	877[2]	1.0 meters
Manokin River Mesohaline	MANMH1	4,294	2.0 meters

Manokin River Mesohaline	MANMH2	59	0.5 meters
Big Annemessex River Mesohaline	BIGMH1	2,021	2.0 meters
Big Annemessex River Mesohaline	BIGMH2	22	0.5 meters
Tangier Sound Mesohaline	TANMH1	24,683[2]	2.0 meters
Tangier Sound Mesohaline	TANMH2	74	0.5 meters
Middle Nanticoke River Oligohaline	NANOH	12	0.5 meters
Lower Nanticoke River Mesohaline	NANMH	3	0.5 meters
Wicomico River Mesohaline	WICMH	3	0.5 meters
Fishing Bay Mesohaline	FSBMH	197	0.5 meters
Middle Choptank River Oligohaline	CHOOH	72	0.5 meters
Lower Choptank River Mesohaline	CHOMH2	1,621	1.0 meters
Mouth of Choptank River Mesohaline	CHOMH1	8,184	2.0 meters
Little Choptank River Mesohaline	LCHMH	4,076	2.0 meters
Honga River Mesohaline	HNGMH	7,761	2.0 meters
Eastern Bay	EASMH	6,209	2.0 meters
Middle Chester River Oligohaline	CHSOH	77	0.5 meters
Lower Chester River Mesohaline	CHSMH	2,928	1.0 meters
Chesapeake & Delaware (C&D) Canal	C&DOH	7	0.5 meters
Northeast River Tidal Fresh	NORTF	89	0.5 meters
Bohemia River Oligohaline	BOHOH	354	0.5 meters
Elk River Oligohaline	ELKOH1	1,844	2.0 meters
Elk River Oligohaline	ELKOH2	190	0.5 meters
Sassafras River Oligohaline	SASOH1	1,073	2.0 meters
Sassafras River Oligohaline	SASOH2	95	0.5 meters
Bush River Oligohaline	BSHOH	350	0.5 meters
Gunpowder River Oligohaline	GUNOH2	572	2.0 meters
Mouth of Gunpowder River	GUNOH1	1,860	0.5 meters
Middle River Oligohaline	MIDOH	879	2.0 meters
Patapsco River Mesohaline	PATMH	389	1.0 meters
Magothy River Mesohaline	MAGMH	579	1.0 meters
Severn River Mesohaline	SEVMH	455	1.0 meters
South River Mesohaline	SOUMH	479	1.0 meters
Rhode River Mesohaline	RHDMH	60	0.5 meters
West River Mesohaline	WSTMH	238	0.5 meters
Upper Patuxent River Tidal Fresh	PAXTF	205	0.5 meters
Middle Patuxent River Oligohaline	PAXOH	115	0.5 meters
Lower Patuxent River Mesohaline	PAXMH1	1,459	2.0 meters
Lower Patuxent River Mesohaline	PAXMH2	172	0.5 meters
Lower Patuxent River Mesohaline	PAXMH4	1	0.5 meters
Lower Patuxent River Mesohaline	PAXMH5	2	0.5 meters
Lower Potomac River Tidal Fresh	POTTF	2,142[2]	2.0 meters
Piscataway Creek Tidal Fresh	PISTF	789	2.0 meters
Mattawoman Creek Tidal Fresh	MATTF	792	1.0 meters
Lower Potomac River Oligohaline	POTOH1	1,387[2]	2.0 meters
Lower Potomac River Oligohaline	POTOH2	262	1.0 meters
Lower Potomac River Oligohaline	POTOH3	1,153	1.0 meters

Lower Potomac River Mesohaline	POTMH	7,088[2]	1.0 meters
Upper Chesapeake Bay	CB2OH	705	0.5 meters
Upper Central Chesapeake Bay	CB3MH	1,370	0.5 meters
Middle Central Chesapeake Bay	CB4MH	2,533	2.0 meters
Lower Central Chesapeake Bay	CB5MH	8,270[2]	2.0 meters

[1] The segments Middle Pocomoke Oligohaline (POCOH-application depth = 0.5 meters), Upper Chester River Tidal Fresh (CHSTP-application depth = 0.5 meters), Back River Oligohaline (BACOH-application depth = 0.5 meters), and West Branch Patuxent River (WBRTF-application depth = 0.5 meters), and Lower Patuxent River Mesohaline Subsegments 3 and 6 (PAXMH3 & PAXMH6-application depths = 0.5 meters), and the Anacostia River Tidal Fresh (ANATF-application depth = 0.5 meters) are not listed above because the SAV Restoration goal for each segment is 0 acres, based on the required historical SAV presence criteria used to set the restoration goal for each segment. These segments have been assigned a water clarity criteria and application depth. Attainment of the shallow-water designated use will be determined using the method outlined in §C(9)(a)(i)—(iii) and (c) of this regulation.

[2]Maryland portion of the segment.

(d) SAV No Grow Zones. Certain Chesapeake Bay segments contain areas designated as shallow water use that are not suitable for growth of submerged aquatic vegetation due to natural conditions. Figures V-1 to V-12 of the "Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability (EPA 903-R-04-006)" which is incorporated by reference, indicate the SAV No Grow Zones.

(e) Implementation. The attainment of the water clarity criteria that apply to the seasonal shallow-water submerged aquatic vegetation use subcategory in the Chesapeake Bay and tidally influenced tributary waters will be determined consistent with the guidelines documented within the 2003 U.S. Environmental Protection Agency publication "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries (EPA 903-R-04-005)", the "Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and its Tidal Tributaries-2004 Addendum (EPA 903-R-04-005)", and the Technical Support Document for Identification of Chesapeake Bay Designated Uses and Attainability-2004 Addendum (EPA 903-R-04-006) which are incorporated by reference.

(10) Chlorophyll a. Concentrations of chlorophyll a in free-floating microscopic aquatic plants (algae) may not exceed levels that result in ecologically undesirable consequences that would render tidal waters unsuitable for designated uses.

(11) Compliance Schedules for Protection of Downstream Uses in Tidal Waters.

(a) The compliance schedule provisions of COMAR 26.08.04.02C are applicable to discharge permits issued to existing dischargers which contain new or revised effluent limitations based on water quality standards contained in §C(8) and (9) of this regulation.

(b) An upstream state issuing discharge permits to existing dischargers which contain new or revised effluent limitations based on the water quality standards contained in §C(8) and (9) of this regulation may apply the compliance schedule provisions of COMAR 26.08.04.02C.

C-1. Criteria for Use II-P Waters—Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting and Public Water Supplies. The following criteria apply:

(1) The criteria for Use II waters in §C(1)—(8), (9)(a)—(c), (10), and (11); and

(2) All toxic substance criteria:

(a) For protection of fresh water and freshwater-adapted estuarine aquatic organisms apply; and

(b) To protect public water supplies and the wholesomeness of fish and shellfish for human consumption.

D. Criteria for Use III Waters—Nontidal Cold Water.

(1) Bacteriological—same as Use I waters.

(2) Dissolved Oxygen. The dissolved oxygen concentration may not be less than 5 milligrams/liter at any time, with a minimum daily average of not less than 6 milligrams/liter.

(3) Temperature.

(a) The maximum temperature outside the mixing zone determined in accordance with Regulation .05 of this chapter or COMAR 26.08.03.03—.05 may not exceed 68?F (20?C) or the ambient temperature of the surface waters, whichever is greater.

(b) Ambient temperature—Same as Use I.

(c) A thermal barrier that adversely affects salmonid fish may not be established.

(d) It is the policy of the State that riparian forest buffer adjacent to Use III waters shall be retained whenever possible to maintain the temperatures essential to meeting this criterion.

(4) pH—same as Use I waters.

(5) Turbidity—same as Use I waters.

(6) Color—Same as Use I waters.

(7) Total Residual Chlorine (TRC). Except as provided in COMAR 26.08.03.06, the Department may not issue a permit allowing the use of chlorine or chlorine-containing compounds in the treatment of wastewaters discharging to Use III and Use III-P waters.

(8) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms apply; and

(b) The wholesomeness of fish for human consumption apply.

E. Criteria for Use III-P Waters—Nontidal Cold Water and Public Water Supplies.

(1) Exception. Authorized operation of the Little Seneca Creek Dam means that all operational activities permitted are met under the conditions of a dam operating permit issued by the Department of Natural Resources under Natural Resources Article, §§8-801—8-814, Annotated Code of Maryland, and COMAR 08.05.03. Injury resulting from the authorized operation of Little Seneca Creek Dam to the Use III natural trout fishery recognized in the stream use designation assigned to Little Seneca Creek in Regulation .08 of this chapter is not considered a violation of this chapter.

(2) The following criteria apply:

(a) The criteria for Use III waters in §D(1)—(7); and

(b) All toxic substance criteria to protect:

(i) Fresh water aquatic organisms, and

(ii) Public water supplies and the wholesomeness of fish for human consumption.

F. Criteria for Use IV Waters—Recreational Trout Waters.

(1) Bacteriological—same as Use I waters.

(2) Dissolved oxygen—same as Use I waters.

(3) Temperature.

(a) The maximum temperature outside the mixing zone determined in accordance with Regulation .05 of this chapter or COMAR 26.08.03.03—.05 may not exceed 75°F (23.9°C) or the ambient temperature of the surface waters, whichever is greater.

(b) Ambient temperature—Same as Use I.

(c) A thermal barrier that adversely affects salmonid fish may not be established.

(d) It is the policy of the State that riparian forest buffer adjacent to Use IV waters shall be retained whenever possible to maintain the temperatures essential to meeting this criterion.

(4) pH—same as Use I waters.

(5) Turbidity—same as Use I waters.

(6) Color—same as for Use I waters.

(7) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms apply; and

(b) The wholesomeness of fish for human consumption apply.

G. Criteria for Use IV-P Waters—Recreational Trout Waters and Public Water Supplies. The following criteria apply:

(1) The criteria for Use IV waters in §F(1)—(6); and

(2) Toxic Substance Criteria. All toxic substance criteria to protect:

(a) Fresh water aquatic organisms, and

(b) Public water supplies and the wholesomeness of fish for human consumption.

.03-2 Numerical Criteria for Toxic Substances in Surface Waters.

A. Numerical toxic substance criteria shall be applied:

(1) In intermittent streams, at the end of the discharge pipe; and

(2) In all other water bodies, at the edge of the mixing zones determined in accordance with Regulation .05C—E of this chapter.

B. Acceptable laboratory methods for the detection and measurement of toxic substances shall be specified by the Department.

C. Site-specific numerical toxic substance criteria may be developed on a site-specific basis. A person who wishes to develop a site-specific numerical toxic substance criterion shall:

(1) Do so in accordance with a scientifically defensible methodology approved by the Department; and

(2) Notify the Department of their intent not later than the time specified in COMAR 26.08.04.01-1.

D. The toxicity of certain substances in Tables 1 and 4 of §G of this regulation is increased or decreased by hardness or pH. For these toxic substances:

(1) The Department may:

(a) Require the discharger to provide site-specific measurements; or

(b) Recalculate the aquatic life criteria based on available water quality data.

(2) The permittee may voluntarily provide site-specific information for the recalculation of the criteria. It is within the Department's discretion to determine the weight given this information.

(3) After reviewing the information provided in §D(1) or (2), the Department shall determine if one or more of these criteria should be modified at a particular location.

E. In those cases where numerical toxic substance criteria for aquatic life protection and protection of human health both apply, the most restrictive of the criteria shall be used.

F. Acute and chronic numeric toxic substance criteria for fresh, estuarine, and salt water aquatic life protection and for human health protection are shown in Tables 1—4 of §G. For the instream application of the acute and chronic criteria for the protection of aquatic life in Tables 1—4 of §G of this regulation:

(1) The metals shall be measured as dissolved metal or as biologically available equivalence and may be translated to total recoverable measurements for waste load allocation to derive discharge permit limits using the procedures for the biological translator or chemical translator described in COMAR 26.08.04;

(2) The organic substances shall be measured directly or as biologically available equivalence and may be translated for waste load allocation to derive discharge permit limits using the procedures for the biological translator described in COMAR 26.08.04; and

(3) Cyanide shall be measured as either free cyanide or cyanide amenable to chlorination.

G. Tables of Ambient Water Quality Criteria.

(1) Table 1. Toxic Substances Criteria for Ambient Surface Waters-Inorganic Substances.

		Human Health for Consumption of

Substance CAS		Aquatic Life (µg/L)						(Risk Level = 10^{-5}) (µg/L)	
		Fresh Water		Estuarine Water		Salt Water		Drinking Water + Organism	Organism Only
		Acute	Chronic	Acute	Chronic	Acute	Chronic		
Antimony	7440360							5.6	640
Arsenic[1]	7440382	340	150			69	36	10	41[a]
Asbestos	1332214							7 million fibers/L	
Barium	7440393							2,000	
Beryllium[3]								4	
Cadmium[1, 3]	7440439	2.0	0.25			40	8.8	5	
Chlorine[2]	7782505	19	11			13	7.5		
Chromium (total)	7440473							100	
Chromium III[1]	16065831	570	74						
Chromium VI	18540299	16	11			1100	50		
Copper[1]	7440508	13	9	6.1		4.8	3.1	1,300	
Cyanide	57125	22	5.2			1	1	700	220,000
Lead[1]	7439921	65	2.5			210	8.1		
Mercury	7439976	1.4	0.77			1.8	0.94		
Methylmercury	22967926								0.3 mg/kg
Nickel[1]	7440020	470	52			74	8.2	610	4,600
Selenium	7782492	20	5			290	71	170	4,200
Silver[1]	7440224	3.2				1.9			
Thallium	7440280							1.7	6.3
Zinc[1]	7440666	120	120			90	81	7,400	26,000

[1] Refer to §D of this regulation.

[2]The more stringent of these criteria or the discharge requirements in COMAR 26.08.03.06 shall be used as the basis for determining discharge permit limitations.

[3] The drinking water + organism criterion is the Safe Drinking Water Maximum Contaminant Level.

[a] This criterion will be applied against the actual measurement of inorganic arsenic (As+3) rather than total arsenic.

(2) Table 2. Toxic Substances for Ambient Water Quality Criteria-Organic Compounds.

Substance CAS		Aquatic Life (µg/L)				Human Health for Consumption of: (Risk Level = 10^{-5}) (µg/L)	
		Fresh Water		Salt Water			
		Acute	Chronic	Acute	Chronic	Water + Organism	Organism Only
1,1 Dichloroethylene (DCE)	75354					0.57	32
1,1,1-Trichloroethane (TCA)[2]	71556					200	
1,1,2,2-Tetrachloroethane	79345					1.7	4.0
1,1,2-Trichloroethane	79005					5.9	160

1,2,4-Trichlorobenzene	120821					260	940
1,2-Dichlorobenzene	95501					2,700	17,000
1,2-Dichloroethane	107062					3.8	370
1,2-Dichloropropane	78875					5.0	150
1,2-Diphenylhydrazine	122667					0.36	2.0
1,2-Trans-Dichloroethylene	156605					700	140,000
1,3-Dichlorobenzene	541731					320	960
1,3-Dichloropropene	542756					10	1,700
1,4-Dichlorobenzene	106467					400	2,600
2,4,6-Trichlorophenol	88062					14	24
2,4-Dichlorophenol	120832					77	290
2,4-Dimethylphenol	105679					380	850
2,4-Dinitrophenol	51285					69	5,300
2,4-Dinitrotoluene	121142					1.1	34
2-Chloronapthalene	91587					1,000	1,600
2-Chlorophenol	95578					81	150
2-Methyl-4,6-Dinitrophenol	534521					13	280
3,3'-Dichlorobenzidine	91941					0.21	0.28
Acrolein	107028					190	290
Acrylonitrile	107131					0.51	2.5
Benzene	71432					22	510
Benzidine	92875					0.00086	0.0020
Bis(2-Chloroethyl)Ether	111444					0.30	5.3
Bis2(Chloroisopropyl) Ether	108601					1400	65,000
Bromoform[2]	75252					See Trihalomethanes	1,400
Carbon tetrachloride	56235					2.3	16
Chlorobenzene	108907					680	21,000
Chlorodibromomethane[2]	124481					See Trihalomethanes	130
Chloroform2	67663					See Trihalomethanes	4,700
Dichlorobromomethane2	75274					See Trihalomethanes	170
Ethylbenzene	100414					3,100	29,000
Hexachlorobenzene	118741					0.0028	0.0029
Hexachlorobutadiene	87683					4.4	180
Hexachlorocyclopentadiene	77474					240	17,000
Hexachloroethane	67721					14	33
Isophorone	78591					350	9,600
Methyl bromide	74839					47	1,500
Methylene chloride	75092					46	5,900

Nitrobenzene	98953					17	690
N-Nitrosodimethylamine	62759					0.0069	30
N-Nitrosodi-n-Propylamine	621647					0.050	5.1
N-Nitrosodiphenylamine	86306					33	60
Phenol	108952					21,000	1,700,000
Tetrachloroethylene	127184					6.9	33
Toluene	10883					6,800	200,000
Trichloroethylene (TCE)	79016					25	300
Trihalomethanes[2]						80	
Vinyl chloride	75014					20	5,300

[1] The drinking water + organism criterion is the Safe Drinking Water Maximum Contaminant Level.

[2] Four compounds (bromoform, chlorodibromomethane, chloroform, and dichlorodibromomethane) are found in combination and comprise a category of contaminants called "trihalomethanes" formed as a result of drinking water disinfection. The concentration of any of these compounds individually, or all of them in sum, may not exceed 80 micrograms per liter. This criterion is equal to the Safe Drinking Water Act Maximum Contaminant Level.

(3) Table 3. Toxic Substances for Ambient Water Quality Criteria-Polycyclic Aromatic Hydrocarbons and Phthalates.

Substance CAS		Aquatic Life (µg/L)				Human Health for Consumption of: (Risk Level = 10^{-5}) (µg/L)	
		Fresh Water		Salt Water			
		Acute	Chronic	Acute	Chronic	Water + Organism	Organism Only
Acenaphthene	83329					670	990
Anthracene	120127					8,300	40,000
Benzo(a)Anthracene	56553					0.038	0.18
Benzo(a)Pyrene	50328					0.038	0.18
Benzo(b)Fluoranthene	205992					0.038	0.18
Benzo(k)Fluoranthene	207089					0.038	0.18
Chrysene	218019					0.038	0.18
Dibenzo(a,h)Anthracene	53703					0.038	0.18
Fluoranthene	206440					130	140
Fluorene	86737					1,100	5,300
Ideno 1,2,3-cdPyrene	193395					0.038	0.18
Pyrene	129000					830	4,000
Bis(2-Ethylhexyl) Phthalate	117817					12	22
Butylbenzyl Phthalate	85687					1,500	1,900
Diethyl Phthalate	84662					17,000	44,000
Dimethyl Phthalate	131113					270,000	1,100,000
Di-n-Butyl Phthalate	84742					2,000	4,500

(4) Table 4. Toxic Substances for Ambient Water Quality Criteria-Pesticides and Chlorinated Compounds.

	Aquatic Life (µg/L)		Human Health for Consumption

Substance CAS		Fresh Water		Salt Water		of: (Risk Level = 10^{-5}) (µg/L)	
		Acute	Chronic	Acute	Chronic	Water + Organism	Organism Only
2, 3, 7, 8-TCDD (Dioxin)	1746016					0.00000005	0.00000051
4,4'-DDD	72548					0.0031	0.0031
4,4'-DDE	72559					0.0022	0.0022
4,4'-DDT	50293	1.1	0.001	0.13	0.001	0.0022	0.0022
Aldrin	309002	3		1.3		0.00049	0.00050
Alpha-BHC	319846					0.026	0.049
Alpha-Endosulfan	959988	0.22	0.056	0.034	0.0087	62	89
Atrazine	319857					3	
Beta-BHC	319857					0.091	0.17
Beta-Endosulfan	33213659	0.22	0.056	0.034	0.0087	62	89
Chlordane	57749	2.4	0.0043	0.09	0.004	0.0080	0.0081
Chloropyrifos	2921882	0.083					
Dieldrin	60571	0.24	0.056	0.71	0.0019	0.00052	0.00054
Endosulfan Sulfate	1031078					62	89
Endrin	72208	0.086	0.036	0.037	0.0023	0.76	0.81
Endrin Aldehyde	7421934					0.29	0.30
Gamma-BHC (Lindane)	58899	0.95		0.16		0.19	0.63
Heptachlor	76448	0.52	0.0038	0.053	0.0036	0.00079	0.00079
Heptachlor Epoxide	1024573	0.52	0.0038	0.053	0.0036	0.00039	0.00039
Polychlorinated Biphenyls PCBs			0.014		0.03	0.00064	0.00064
Toxaphene	8001352	0.73	0.0002	0.21	0.0002	0.0028	0.0028
Tributyltin (TBT)		0.46	0.063	0.37	0.010		
Pentachlorophenol (PCP)[1]	87865	19	15	13	7.9	2.7	30

[1] Refer to §D of this regulation.

H. Acute Numeric Toxic Substance Criteria for Ammonia for the Protection of Fresh Water Aquatic Life (Table 1).

(1) Presence of Salmonid Fish. In Use III, III-P, IV, and IV-P waters, the concentration of total ammonia (in milligrams of nitrogen per liter) may not exceed the acute criterion listed under "Salmonids Present" in Table 1.

(2) Absence of Salmonid Fish. In Use I and I-P waters, the concentration of total ammonia (in milligrams of nitrogen per liter) may not exceed the acute criterion listed under "Salmonids Absent" in Table 1.

(3) Table 1. Acute Water Quality Criteria for freshwater Aquatic Life (milligrams of nitrogen per liter).

pH	Salmonids Present[1]	Salmonids Absent[2]
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1

7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

[1] The acute water quality criteria for total ammonia where salmonids may be present was calculated using the following equation, which may also be used to calculate unlisted values: Acute water quality criteria for ammonia (salmonids present) = [0.275/(1+107.204 - pH)]+[39.0/ (1+10pH - 7.204)]

[2] The acute water quality criteria for total ammonia where salmonids are absent were calculated using the following equation, which may also be used to calculate unlisted values: Acute water quality criteria for ammonia (salmonids absent) = [0.411/(1+107.204 - pH)]+[58.4/ (1+10pH - 7.204)]

I. Chronic Numeric Toxic Substance Criteria for Ammonia, Expressed as a 30-day Average, for the Protection of Fresh Water Aquatic Life (Tables 1 and 2).

(1) Averaging Period. The concentration of total ammonia nitrogen (in milligrams of nitrogen per liter) expressed as a 30-day average may not exceed the chronic criterion listed in Tables 1 or 2.

(2) The use of Table 2 requires documentation acceptable to the Department of the absence of fish early life stages.

(3) In addition, the highest 4-day average within the 30-day period may not exceed 21/2 times the chronic criterion.

(4) Table 1. Chronic Ammonia Criteria for Waters Where Freshwater Fish Early Life Stages May Be Present (milligrams of nitrogen per liter).1

	Temperature (°C)									
pH	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32

6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

[1] The freshwater chronic water quality criteria for total ammonia where fish early life stages may be present were calculated using the following equation, which may also be used to calculate unlisted values:

Freshwater chronic water quality criterion for ammonia (fish early life stages present) = [0.0577/(1 + 107.688 - pH)]+ [2.487/(1 + 10pH - 7.688)] X MIN(2.85, 1.45 X 100.028 xw(25 - T))

Where MIN indicates the lesser of the two values separated by a comma.

(5) Table 2. Chronic Ammonia Criteria for Waters Where Freshwater Fish Early Life Stages Are Absent (milligrams of nitrogen per liter).1

Temperature (°C)										
pH	0—7	8	9	10	11	12	13	14	15[2]	16[2]
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97

7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

[1]The freshwater chronic water quality criteria for total ammonia where fish early life stages are absent were calculated using the following equation, which may also be used to calculate unlisted values:

Freshwater chronic water quality criterion for ammonia (fish early life stages absent) = [0.0577/(1 + 107.688 - pH)] + [2.487/(1 + 10pH - 7.688)] x 1.45 x 100.028 \x (25 - MAX(T,7))

Where MAX indicates the greater of the two values separated by a comma.

[2]At 15°C and above, the criterion for fish early life stage absent is the same as the criterion for fish early life stage present.

J. Saltwater and Estuarine Acute Criteria for Ammonia. Acute numeric toxic substance criteria for ammonia to protect marine and estuarine life are shown in Table 1. In estuarine and saltwaters, the concentration of total ammonia (in milligrams/liter) may not exceed the acute criterion listed in Table 1. Milligrams per liter total ammonia in saltwater (Table 1) may be converted to milligrams of ammonia nitrogen per liter (as used in §§H and I of this regulation) by multiplying the criteria values in Table 1 by 14/17 (or 0.82353) to result in total ammonia nitrogen.

Table 1 Acute Water Quality Criteria for Saltwater Aquatic Life (milligrams per liter total ammonia).

Temperature (°C)								
	0	5	10	15	20	25	30	35
pH	Salinity = 10 parts per thousand							
7.0	270	191	131	92	62	44	29	21
7.2	175	121	83	58	40	27	19	13
7.4	110	77	52	35	25	17	12	8.3
7.6	69	48	33	23	16	11	7.7	5.6
7.8	44	31	21	15	10	7.1	5.0	3.5
8.0	27	19	13	9.4	6.4	4.6	3.1	2.3
8.2	18	12	8.5	5.8	4.2	2.9	2.1	1.5
8.4	11	7.9	5.4	3.7	2.7	1.9	1.4	1.0
8.6	7.3	5.0	3.5	2.5	1.8	1.3	0.98	0.75
8.8	4.6	3.3	2.3	1.7	1.2	0.92	0.71	0.56
9.0	2.9	2.1	1.5	1.1	0.85	0.67	0.52	0.44
pH	Salinity = 20 parts per thousand							

7.0	291	200	137	96	64	44	31	21
7.2	183	125	87	60	42	29	20	14
7.4	116	79	54	37	27	18	12	8.7
7.6	73	50	35	23	17	11	7.9	5.6
7.8	46	31	23	15	11	7.5	5.2	3.5
8.0	29	20	14	9.8	6.7	4.8	3.3	2.3
8.2	19	13	8.9	6.2	4.4	3.1	2.1	1.6
8.4	12	8.1	5.6	4.0	2.9	2.0	1.5	1.1
8.6	7.5	5.2	3.7	2.7	1.9	1.4	1.0	0.77
8.8	4.8	3.3	2.5	1.7	1.3	0.94	0.73	0.56
9.0	3.1	2.3	1.6	1.2	0.87	0.69	0.54	0.44
pH	Salinity = 30 parts per thousand							
7.0	312	208	148	102	71	48	33	23
7.2	196	135	94	64	44	31	21	15
7.4	125	85	58	40	27	19	13	9.4
7.6	79	54	37	25	21	12	8.5	6.0
7.8	50	33	23	16	11	7.9	5.4	3.7
8.0	31	21	15	10	7.3	5.0	3.5	2.5
8.2	20	14	9.6	6.7	4.6	3.3	2.3	1.7
8.4	12.7	8.7	6.0	4.2	2.9	2.1	1.6	1.1
8.6	8.1	5.6	4.0	2.7	2.0	1.4	1.1	0.81
8.8	5.2	3.5	2.5	1.8	1.3	1.0	0.75	0.58
9.0	3.3	2.3	1.7	1.2	0.94	0.71	0.56	0.46

K. Saltwater and Estuarine Chronic Criteria for Ammonia.

(1) Chronic numeric toxic substance criteria for ammonia to protect marine and estuarine life are shown in Table 1.

(2) Averaging Period. The concentration of total ammonia (in milligrams/liter) expressed as a 30-day average may not exceed the chronic criterion listed in Table 1.

(3) Milligrams per liter total ammonia in saltwater (Table 1) may be converted to milligrams of ammonia nitrogen per liter (as used in §§H and I of this regulation) by multiplying the criteria values in Table 1 by 14/17 (or 0.82353) to result in total ammonia nitrogen.

Table 1 Chronic Water Quality Criteria for Saltwater Aquatic Life (milligrams/liter total ammonia).

Temperature (°C)								
	0	5	10	15	20	25	30	35
pH	Salinity = 10 parts per thousand							
7.0	41	29	20	14	9.4	6.6	4.4	3.1
7.2	26	18	12	8.7	5.9	4.1	2.8	2.0
7.4	17	12	7.8	5.3	3.7	2.6	1.8	1.2
7.6	10	7.2	5.0	3.4	2.4	1.7	1.2	0.84
7.8	6.6	4.7	3.1	2.2	1.5	1.1	0.75	0.53
8.0	4.1	2.9	2.0	1.40	0.97	0.69	0.47	0.34
8.2	2.7	1.8	1.3	0.87	0.62	0.44	0.31	0.23

8.4	1.7	1.2	0.81	0.56	0.41	0.29	0.21	0.16
8.6	1.1	0.75	0.53	0.37	0.27	0.20	0.15	0.11
8.8	0.69	0.50	0.34	0.25	0.18	0.14	0.11	0.08
9.0	0.44	0.31	0.23	0.17	0.13	0.10	0.08	0.07
pH	Salinity = 20 parts per thousand							
7.0	44	30	21	14	9.7	6.6	4.7	3.1
7.2	27	19	13	9.0	602	4.4	3.0	2.1
7.4	18	12	8.1	5.6	4.1	2.7	1.9	1.3
7.6	11	7.5	5.3	3.4	2.5	1.7	1.2	0.84
7.8	6.9	4.7	3.4	2.3	1.6	1.1	0.78	0.53
8.0	4.4	3.0	2.1	1.5	1.0	0.72	0.50	0.34
8.2	2.8	1.9	1.3	0.94	0.66	0.47	0.31	0.24
8.4	1.8	1.2	0.84	0.59	0.44	0.30	0.22	0.16
8.6	1.1	0.78	0.56	0.41	0.28	0.20	0.15	0.12
8.8	0.72	0.50	0.37	0.26	0.19	0.14	0.11	0.08
9.0	0.47	0.34	0.24	0.18	0.13	0.10	0.08	0.07
pH	Salinity = 30 parts per thousand							
7.0	47	31	22	15	11	7.2	5.0	3.4
7.2	29	20	14	9.7	6.6	4.7	3.1	2.2
7.4	19	13	8.7	5.9	4.1	2.9	2.0	1.4
7.6	12	8.1	5.6	3.7	3.1	1.8	1.3	0.90
7.8	7.5	5.0	3.4	2.4	1.7	1.2	0.81	0.56
8.0	4.7	3.1	2.2	1.6	1.1	0.75	0.53	0.37
8.2	3.0	2.1	1.4	1.0	0.69	0.50	0.34	0.25
8.4	1.9	1.3	0.90	0.62	0.44	0.31	0.23	0.17
8.6	1.2	0.84	0.59	0.41	0.30	0.22	0.16	0.12
8.8	0.78	0.53	0.37	0.27	0.20	0.15	0.11	0.09
9.0	0.50	0.34	0.26	0.19	0.14	0.11	0.08	0.07

Attachment 7

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Maderia School WWTP Permit No.: VA0024121

Receiving Stream: Difficult Run, UT Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	mg/L	1Q10 (Annual) =	0 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	156 mg/L
90% Temperature (Annual) =	deg C	7Q10 (Annual) =	0 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	25 deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	0 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	deg C
90% Maximum pH =	SU	1Q10 (Wet season) =	0 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	8.4 SU
10% Maximum pH =	SU	30Q10 (Wet season)	0 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	7.4 SU
Tier Designation (1 or 2) =	1	30Q5 =	0 MGD			Discharge Flow =	0.0495 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	0 MGD				
Trout Present Y/N? =	n	Annual Average =	0 MGD				
Early Life Stages Present Y/N? =	n						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	2.7E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
Acrolein	0	--	--	na	7.8E+02	--	--	na	7.8E+02	--	--	--	--	--	--	--	--	--	--	na	7.8E+02
Acrylonitrile [C]	0	--	--	na	6.6E+00	--	--	na	6.6E+00	--	--	--	--	--	--	--	--	--	--	na	6.6E+00
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	3.0E+00	--	na	1.4E-03	--	--	--	--	--	--	--	--	3.0E+00	--	na	1.4E-03
Ammonia-N (mg/l) (Yearly)	0	3.88E+00	6.56E-01	na	--	3.9E+00	6.6E-01	na	--	--	--	--	--	--	--	--	--	3.9E+00	6.6E-01	na	--
Ammonia-N (mg/l) (High Flow)	0	3.88E+00	2.09E+00	na	--	3.9E+00	2.1E+00	na	--	--	--	--	--	--	--	--	--	3.9E+00	2.1E+00	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Antimony	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	7.1E+02	--	--	--	--	--	--	--	--	--	--	na	7.1E+02
Benzidine [C]	0	--	--	na	5.4E-03	--	--	na	5.4E-03	--	--	--	--	--	--	--	--	--	--	na	5.4E-03
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	--	--	na	1.7E+05
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	3.6E+03	--	--	--	--	--	--	--	--	--	--	na	3.6E+03
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	5.2E+03	--	--	--	--	--	--	--	--	--	--	na	5.2E+03
Cadmium	0	6.5E+00	1.6E+00	na	--	6.5E+00	1.6E+00	na	--	--	--	--	--	--	--	--	--	6.5E+00	1.6E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	2.4E+00	4.3E-03	na	2.2E-02	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	2.2E-02
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	3.4E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
Chloroform [C]	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	8.2E+02	1.1E+02	na	--	8.2E+02	1.1E+02	na	--	--	--	--	--	--	--	--	--	8.2E+02	1.1E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Copper	0	2.0E+01	1.3E+01	na	--	2.0E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	2.0E+01	1.3E+01	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	2.2E+01	5.2E+00	na	2.2E+05	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	2.2E+05
DDD [C]	0	--	--	na	8.4E-03	--	--	na	8.4E-03	--	--	--	--	--	--	--	--	--	--	na	8.4E-03
DDE [C]	0	--	--	na	5.9E-03	--	--	na	5.9E-03	--	--	--	--	--	--	--	--	--	--	na	5.9E-03
DDT [C]	0	1.1E+00	1.0E-03	na	5.9E-03	1.1E+00	1.0E-03	na	5.9E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	5.9E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Dichloromethane (Methylene Chloride) [C]	0	--	--	na	1.6E+04	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	--	--	na	1.6E+04
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
3,3-Dichlorobenzidine[C]	0	--	--	na	7.7E-01	--	--	na	7.7E-01	--	--	--	--	--	--	--	--	--	--	na	7.7E-01
Dichlorobromomethane [C]	0	--	--	na	4.6E+02	--	--	na	4.6E+02	--	--	--	--	--	--	--	--	--	--	na	4.6E+02
1,2-Dichloroethane [C]	0	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	--	--	na	9.9E+02
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	7.9E+02	--	--	--	--	--	--	--	--	--	--	na	7.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	3.9E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	--	--	na	3.9E+02
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dieldrin [C]	0	2.4E-01	5.6E-02	na	1.4E-03	2.4E-01	5.6E-02	na	1.4E-03	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	1.4E-03
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	1.2E+05
Di-2-Ethylhexyl Phthalate [C]	0	--	--	na	5.9E+01	--	--	na	5.9E+01	--	--	--	--	--	--	--	--	--	--	na	5.9E+01
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	--	--	na	2.3E+03
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	2.9E+06	--	--	--	--	--	--	--	--	--	--	na	2.9E+06
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	--	--	na	7.7E+02
2,4-Dinitrotoluene [C]	0	--	--	na	9.1E+01	--	--	na	9.1E+01	--	--	--	--	--	--	--	--	--	--	na	9.1E+01
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	--	--	--	--	--	--	--	--	na	na
1,2-Diphenylhydrazine[C]	0	--	--	na	5.4E+00	--	--	na	5.4E+00	--	--	--	--	--	--	--	--	--	--	na	5.4E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	2.4E+02	--	--	--	--	--	--	--	--	--	--	na	2.4E+02
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	8.6E-02	3.6E-02	na	8.1E-01	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	8.1E-01
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	8.1E-01	--	--	--	--	--	--	--	--	--	--	na	8.1E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
Fluorene	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	2.1E-03	5.2E-01	3.8E-03	na	2.1E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	2.1E-03
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	1.1E-03	5.2E-01	3.8E-03	na	1.1E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	1.1E-03
Hexachlorobenzene [C]	0	--	--	na	7.7E-03	--	--	na	7.7E-03	--	--	--	--	--	--	--	--	--	--	na	7.7E-03
Hexachlorobutadiene [C]	0	--	--	na	5.0E+02	--	--	na	5.0E+02	--	--	--	--	--	--	--	--	--	--	na	5.0E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	1.3E-01	--	--	na	1.3E-01	--	--	--	--	--	--	--	--	--	--	na	1.3E-01
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	4.6E-01	--	--	na	4.6E-01	--	--	--	--	--	--	--	--	--	--	na	4.6E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	6.3E-01	9.5E-01	--	na	6.3E-01	--	--	--	--	--	--	--	--	9.5E-01	--	na	6.3E-01
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
Hexachloroethane [C]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	na	8.9E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	--	--	na	4.9E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	2.6E+04	--	--	na	2.6E+04	--	--	--	--	--	--	--	--	--	--	na	2.6E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	2.1E+02	2.4E+01	na	--	2.1E+02	2.4E+01	na	--	--	--	--	--	--	--	--	--	2.1E+02	2.4E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	na	5.1E-02	1.4E+00	7.7E-01	na	5.1E-02	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	na	5.1E-02
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
Nickel	0	2.7E+02	3.0E+01	na	4.6E+03	2.7E+02	3.0E+01	na	4.6E+03	--	--	--	--	--	--	--	--	2.7E+02	3.0E+01	na	4.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
N-Nitrosodimethylamine [C]	0	--	--	na	8.1E+01	--	--	na	8.1E+01	--	--	--	--	--	--	--	--	--	--	na	8.1E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB-1016	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1221	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1232	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1242	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1248	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1254	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1260	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB Total [C]	0	--	--	na	1.7E-03	--	--	na	1.7E-03	--	--	--	--	--	--	--	--	--	--	na	1.7E-03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol [C]	0	1.3E+01	1.0E+01	na	8.2E+01	1.3E+01	1.0E+01	na	8.2E+01	--	--	--	--	--	--	--	--	**1.3E+01**	**1.0E+01**	**na**	**8.2E+01**
Phenol	0	--	--	na	4.6E+06	--	--	na	4.6E+06	--	--	--	--	--	--	--	--	--	--	**na**	**4.6E+06**
Pyrene	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	**na**	**1.1E+04**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Gross Alpha Activity	0	--	--	na	1.5E+01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	--	--	**na**	**1.5E+01**
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	**na**	**4.0E+00**
Strontium-90	0	--	--	na	8.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	**na**	**8.0E+00**
Tritium	0	--	--	na	2.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	**na**	**2.0E+04**
Selenium	0	2.0E+01	5.0E+00	na	1.1E+04	2.0E+01	5.0E+00	na	1.1E+04	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**na**	**1.1E+04**
Silver	0	7.4E+00	--	na	--	7.4E+00	--	na	--	--	--	--	--	--	--	--	--	**7.4E+00**	--	**na**	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
1,1,2,2-Tetrachloroethane [C]	0	--	--	na	1.1E+02	--	--	na	1.1E+02	--	--	--	--	--	--	--	--	--	--	**na**	**1.1E+02**
Tetrachloroethylene [C]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	**na**	**8.9E+01**
Thallium	0	--	--	na	6.3E+00	--	--	na	6.3E+00	--	--	--	--	--	--	--	--	--	--	**na**	**6.3E+00**
Toluene	0	--	--	na	2.0E+05	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	--	--	**na**	**2.0E+05**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	7.5E-03	7.3E-01	2.0E-04	na	7.5E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**na**	**7.5E-03**
Tributyltin	0	4.6E-01	6.3E-02	na	--	4.6E-01	6.3E-02	na	--	--	--	--	--	--	--	--	--	**4.6E-01**	**6.3E-02**	**na**	--
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	9.4E+02	--	--	--	--	--	--	--	--	--	--	**na**	**9.4E+02**
1,1,2-Trichloroethane [C]	0	--	--	na	4.2E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	**na**	**4.2E+02**
Trichloroethylene [C]	0	--	--	na	8.1E+02	--	--	na	8.1E+02	--	--	--	--	--	--	--	--	--	--	**na**	**8.1E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	6.5E+01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	--	--	**na**	**6.5E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Vinyl Chloride [C]	0	--	--	na	6.1E+01	--	--	na	6.1E+01	--	--	--	--	--	--	--	--	--	--	**na**	**6.1E+01**
Zinc	0	1.7E+02	1.7E+02	na	6.9E+04	1.7E+02	1.7E+02	na	6.9E+04	--	--	--	--	--	--	--	--	**1.7E+02**	**1.7E+02**	**na**	**6.9E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens,
   Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	4.3E+03
Arsenic	9.0E+01
Barium	na
Cadmium	9.6E-01
Chromium III	6.4E+01
Chromium VI	6.4E+00
Copper	7.9E+00
Iron	na
Lead	1.4E+01
Manganese	na
Mercury	5.1E-02
Nickel	1.8E+01
Selenium	3.0E+00
Silver	3.0E+00
Zinc	6.8E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.050 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD: 0.050

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	0.050	0.050
7Q10	0.000	N/A	0.050	N/A
30Q10	0.000	0.000	0.050	0.050
30Q5	0.000	N/A	0.050	N/A
Harm. Mean	0.000	N/A	0.050	N/A
Annual Avg.	0.000	N/A	0.050	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	25.000	0.000
30Q10 90th% Temp. Mix (deg C)	25.000	0.000
1Q10 90th% pH Mix (SU)	8.400	8.400
30Q10 90th% pH Mix (SU)	8.400	8.400
1Q10 10th% pH Mix (SU)	7.400	N/A
7Q10 10th% pH Mix (SU)	7.400	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	156.0	156.0
7Q10 Hardness (mg/L as CaCO3)	156.0	156.0

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	8.400
(7.204 - pH)	-1.196
(pH - 7.204)	1.196
Trout Present Criterion (mg N/l	2.593
Trout Absent Criterion (mg N/L	3.883
Trout Present?	n
Effective Criterion (mg N/L)	3.883

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	25.000
90th Percentile pH (SU)	8.400
MIN	1.450
MAX	25.000
(7.688 - pH)	-0.712
(pH - 7.688)	0.712
Early LS Present Criterion (mg N	0.656
Early LS Absent Criterion (mg N/	0.656
Early Life Stages Present?	n
Effective Criterion (mg N/L)	0.656

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	8.400
(7.204 - pH)	-1.196
(pH - 7.204)	1.196
Trout Present Criterion (mg N/l	2.593
Trout Absent Criterion (mg N/L	3.883
Trout Present?	n
Effective Criterion (mg N/L)	3.883

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	0.000
90th Percentile pH (SU)	8.400
MIN	2.850
MAX	7.000
(7.688 - pH)	-0.712
(pH - 7.688)	0.712
Early LS Present Criterion (mg N	1.290
Early LS Absent Criterion (mg N/	2.094
Early Life Stages Present?	n
Effective Criterion (mg N/L)	2.094

0.050 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD: 0.050

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	0.050	0.050
7Q10	0.000	N/A	0.050	N/A
30Q10	0.000	0.000	0.050	0.050
30Q5	0.000	N/A	0.050	N/A
Harm. Mean	0.000	N/A	0.050	N/A
Annual Avg.	0.000	N/A	0.050	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	25.000	0.000
30Q10 90th% Temp. Mix (deg C)	25.000	0.000
1Q10 90th% pH Mix (SU)	8.400	8.400
30Q10 90th% pH Mix (SU)	8.400	8.400
1Q10 10th% pH Mix (SU)	7.400	N/A
7Q10 10th% pH Mix (SU)	7.400	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	156.000	156.000
7Q10 Hardness (mg/L as CaCO3) =	156.000	156.000

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	8.400
(7.204 - pH)	-1.196
(pH - 7.204)	1.196
Trout Present Criterion (mg N/l	2.593
Trout Absent Criterion (mg N/L	3.883
Trout Present?	n
Effective Criterion (mg N/L)	3.883

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	25.000
90th Percentile pH (SU)	8.400
MIN	1.450
MAX	25.000
(7.688 - pH)	-0.712
(pH - 7.688)	0.712
Early LS Present Criterion (mg N	0.656
Early LS Absent Criterion (mg N/	0.656
Early Life Stages Present?	n
Effective Criterion (mg N/L)	0.656

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	8.400
(7.204 - pH)	-1.196
(pH - 7.204)	1.196
Trout Present Criterion (mg N/l	2.593
Trout Absent Criterion (mg N/L	3.883
Trout Present?	n
Effective Criterion (mg N/L)	3.883

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	0.000
90th Percentile pH (SU)	8.400
MIN	2.850
MAX	7.000
(7.688 - pH)	-0.712
(pH - 7.688)	0.712
Early LS Present Criterion (mg N	1.290
Early LS Absent Criterion (mg N/	2.094
Early Life Stages Present?	n
Effective Criterion (mg N/L)	2.094

90th Percentile pH and Temperature

Maderia School WWTP, VA0024121

pH Values	
6/11/01	8.4
7/10/01	8.5
8/10/01	8
9/10/01	8.7
10/12/01	8.3
11/9/01	8.2
12/11/01	8.3
1/11/02	8.4
2/11/02	8.3
3/11/02	8.2
4/10/02	8.3
5/10/02	8
6/12/02	7.8
7/11/02	8
8/12/02	7.7
9/11/02	8.1
10/11/02	8.1
11/12/02	8.4
12/11/02	8.2
1/13/03	8
2/11/03	7.9
3/11/03	7.8
4/11/03	7.8
5/12/03	7.91
6/11/03	8.2
6/11/03	8.2
7/11/03	7.87
8/11/03	7.7
9/11/03	7.7
10/14/03	7.94
11/10/03	7.54
12/9/03	8.12
1/12/04	7.8
2/9/04	7.94
3/9/04	8.1
4/12/04	7.87
5/11/04	7.71
6/10/04	7.3
7/12/04	7.47
8/11/04	8.46
9/13/04	7.39
10/12/04	7.41
11/10/04	7.56
12/13/04	7.89
1/11/05	7.99
2/11/05	7.95

Temperature Values	
6/11/01	20.3
7/10/01	23.2
8/10/01	24
9/10/01	23.7
10/12/01	23.9
11/9/01	20.6
12/11/01	19.9
1/11/02	18.1
2/11/02	16.6
3/11/02	16
4/10/02	16.9
5/10/02	21
6/12/02	21.9
7/11/02	23
8/12/02	25.1
9/11/02	24.8
10/11/02	23.4
11/12/02	23.8
12/11/02	18.3
1/13/03	12.8
2/11/03	12.2
3/11/03	11.4
4/11/03	14.4
5/12/03	18.1
6/11/03	19.8
6/11/03	19.8
7/11/03	21.8
8/11/03	23.6
9/11/03	24
10/14/03	24.5
11/10/03	19.8
12/9/03	21.2
1/12/04	20
2/9/04	12.9
3/9/04	12.1
4/12/04	17
5/11/04	20
6/10/04	24
7/12/04	23
8/11/04	24
9/13/04	24.4
10/12/04	24
11/10/04	23
12/13/04	20
1/11/05	17
2/11/05	15

Attachment 8

90th Percentile pH and Temperature

Maderia School WWTP, VA0024121

pH Values		Temperature Values	
3/10/05	7.59	3/10/05	14
4/11/05	7.72	4/11/05	13
5/11/05	7.61	5/11/05	18
6/10/05	7.94	6/10/05	20
7/11/05	7.44	7/11/05	24
8/10/05	8.02	8/10/05	26
9/12/05	8.06	9/12/05	26
10/11/05	8.19	10/11/05	25
11/10/05	8.42	11/10/05	23.3
12/12/05	8.38	12/12/05	25
1/11/06	8.24	1/11/06	18
2/13/06	8.22	2/13/06	18.1
3/13/06	8.62	3/13/06	16
4/11/06	8.41	4/11/06	16
5/11/06	8.49	5/11/06	20
6/12/06	8.08	6/12/06	24.5
7/11/06	8.32	7/11/06	24.2
8/16/06	8.31	8/16/06	26.7
9/11/06	8.16	9/11/06	27.4
10/10/06	8.09	10/10/06	23.8
11/14/06	8.05	11/14/06	22.4
12/13/06	7.76	12/13/06	20
1/12/07	7.98	1/12/07	19
2/12/07	7.42	2/12/07	18.3
3/14/07	8.83	3/14/07	15.3
4/11/07	8.36	4/11/07	22.8
5/14/07	7.83	5/14/07	19.7
6/7/07	7.45	6/7/07	23
7/11/07	7.14	7/11/07	23.7
8/9/07	7.08	8/9/07	24.8
9/13/07	6.95	9/13/07	25.9
10/9/07	7.41	10/9/07	26.1
11/14/07	7.19	11/14/07	24.1
90th Percentile	**8.40**		**25**
10th Percentile	**7.42**		**15**

12/13/2007 3:06:04 PM

Facility = Maderia School
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 3.9
WLAc = 0.666
Q.L. = 0.2
# samples/mo. = 4
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.34376828221526
Average Weekly limit = 1.34376828221526
Average Monthly LImit = 0.918768938769257

The data are:

9

3/21/2008 9:34:18 AM

Facility = Maderia School
Chemical = Copper
Chronic averaging period = 4
WLAa = 20
WLAc = 13
Q.L. = .2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 9
Expected Value = 9.52555
Variance = 32.6650
C.V. = 0.6
97th percentile daily values = 23.1796
97th percentile 4 day average = 15.8485
97th percentile 30 day average= 11.4883
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 19.013472192692
Average Weekly limit = 19.013472192692
Average Monthly LImit = 19.013472192692

The data are:

10.1
6.41
7.7
9.75
11.7
7.54
9.3
14.1
9.13

1/22/2008 4:56:26 PM

Facility = Maderia School
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 19
WLAc = 11
Q.L. = 100
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 200
Variance = 14400
C.V. = 0.6
97th percentile daily values = 486.683
97th percentile 4 day average = 332.758
97th percentile 30 day average= 241.210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 16.0883226245855
Average Weekly limit = 9.59676626920107
Average Monthly LImit = 7.9737131838758

The data are:

200

REGIONAL MODELING SYSTEM VERSION 3.2

MODEL SIMULATION FOR THE Madeira School STP DISCHARGE

TO Unnamed Tributary to Difficult Run

COMMENT: Madeira School STP Stream Model

THE SIMULATION STARTS AT THE Madeira School STP DISCHARGE

PROPOSED PERMIT LIMITS

FLOW = .04 MGD cBOD5 = 30 Mg/L TKN = 20 Mg/L D.O. = 6 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.011 Mg/L ****

THE SECTION BEING MODELED IS BROKEN INTO 3 SEGMENTS
RESULTS WILL BE GIVEN AT 0.1 MILE INTERVALS

BACKGROUND CONDITIONS

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 0.00000 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 7.480 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

MODEL PARAMETERS

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. °C	DO-SAT Mg/L
1	0.07	0.823	20.000	1.800	0.700	1.219	82.50	25.00	8.311
2	0.15	0.523	20.000	1.500	0.600	0.000	62.50	25.00	8.317
3	5.00	0.823	2.400	1.500	0.500	0.000	50.00	25.00	8.321

(The K Rates shown are at 20°C ... the model corrects them for temperature.)

4/8/92 - 0.04 MGD MODEL

Attachment 10

********** RESPONSE FOR SEGMENT 1 **********

TOTAL STREAMFLOW = 0.0400 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	6.000	75.000	73.610
0.070	0.070	5.048	74.122	73.217

FOR THE TRIBUTARY AT THE END OF SEGMENT 1
FLOW = 1.81 MGD cBOD5 = 2 Mg/L TKN = 0 Mg/L D.O. = 7.48 Mg/L

FLOW FROM INCREMENTAL DRAINAGE AREA = 0.0031 MGD

********** RESPONSE FOR SEGMENT 2 **********

TOTAL STREAMFLOW = 1.8531 MGD
(Including Discharge, Tributaries and Incremental D.A. Flow)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.070	7.427	6.492	1.580
0.100	0.170	7.485	6.350	1.564
0.150	0.220	7.485	6.281	1.556

FOR THE TRIBUTARY AT THE END OF SEGMENT 2
FLOW = 631 MGD cBOD5 = 2 Mg/L TKN = 0 Mg/L D.O. = 7.4853 Mg/L

FLOW FROM INCREMENTAL DRAINAGE AREA = 0.0062 MGD

********** RESPONSE FOR SEGMENT 3 **********

TOTAL STREAMFLOW = 632.8594 MGD
(Including Discharge, Tributaries and Incremental D.A. Flow)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.220	7.485	5.004	0.005
0.100	0.320	7.433	5.000	0.005
0.200	0.420	7.451	5.000	0.005
0.300	0.520	7.468	5.000	0.005
0.400	0.620	7.485	5.000	0.005
0.500	0.720	7.489	5.000	0.005
0.600	0.820	7.489	5.000	0.005
0.700	0.920	7.489	5.000	0.005
0.800	1.020	7.489	5.000	0.005
0.900	1.120	7.489	5.000	0.005
1.000	1.220	7.489	5.000	0.005
1.100	1.320	7.489	5.000	0.005
1.200	1.420	7.489	5.000	0.005
1.300	1.520	7.489	5.000	0.005
1.400	1.620	7.489	5.000	0.005
1.500	1.720	7.489	5.000	0.005
1.600	1.820	7.489	5.000	0.005
1.700	1.920	7.489	5.000	0.005
1.800	2.020	7.489	5.000	0.005
1.900	2.120	7.489	5.000	0.005
2.000	2.220	7.489	5.000	0.005
2.100	2.320	7.489	5.000	0.005
2.200	2.420	7.489	5.000	0.005
2.300	2.520	7.489	5.000	0.005
2.400	2.620	7.489	5.000	0.005
2.500	2.720	7.489	5.000	0.005
2.600	2.820	7.489	5.000	0.005
2.700	2.920	7.489	5.000	0.005
2.800	3.020	7.489	5.000	0.005
2.900	3.120	7.489	5.000	0.005
3.000	3.220	7.489	5.000	0.005
3.100	3.320	7.489	5.000	0.005
3.200	3.420	7.489	5.000	0.005
3.300	3.520	7.489	5.000	0.005
3.400	3.620	7.489	5.000	0.005
3.500	3.720	7.489	5.000	0.005
3.600	3.820	7.489	5.000	0.005
3.700	3.920	7.489	5.000	0.005
3.800	4.020	7.489	5.000	0.005
3.900	4.120	7.489	5.000	0.005
4.000	4.220	7.489	5.000	0.005
4.100	4.320	7.489	5.000	0.005
4.200	4.420	7.489	5.000	0.005
4.300	4.520	7.489	5.000	0.005
4.400	4.620	7.489	5.000	0.005
4.500	4.720	7.489	5.000	0.005
4.600	4.820	7.489	5.000	0.005
4.700	4.920	7.489	5.000	0.005

4.800	5.0	7.489	000	0.005
4.900	5.120	7.489	5.000	0.005
5.000	5.220	7.489	5.000	0.005

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
04-08-1992 20:30:54

DATA FILE = MADEIRA1.MOD

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

THE NAME OF THE DATA FILE IS: MADEIRA1.MOD

THE STREAM NAME IS: Unnamed Tributary to Difficult Run
THE RIVER BASIN IS: Potomac
THE SECTION NUMBER IS: 8
THE CLASSIFICATION IS: 3

STANDARDS VIOLATED (Y/N) = N
STANDARDS APPROPRIATE (Y/N) = Y

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: Madeira School STP

PROPOSED LIMITS ARE:
FLOW = .04 MGD
BOD5 = 30 MG/L
TKN = 20 MG/L
D.O. = 6 MG/L

THE NUMBER OF SEGMENTS TO BE MODELED = 3

7Q10 WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
THE GAUGE NAME IS: Difficult Run Near Great Falls
GAUGE DRAINAGE AREA = 58 SQ.MI.
GAUGE 7Q10 = 1.81 MGD
DRAINAGE AREA AT DISCHARGE = .5 SQ.MI.

STREAM A DRY DITCH AT DISCHARGE (Y/N) = Y
ANTIDEGRADATION APPLIES (Y/N) = Y

ALLOCATION DESIGN TEMPERATURE = 25 °C

SEGMENT INFORMATION

######## SEGMENT # 1 ########

SEGMENT ENDS BECAUSE: A TRIBUTARY ENTERS AT END

SEGMENT LENGTH = .07 MI

SEGMENT WIDTH = 1 FT
SEGMENT DEPTH = .25 FT
SEGMENT VELOCITY = .25 FT/SEC

DRAINAGE AREA AT SEGMENT START = .5 SQ.MI.
DRAINAGE AREA AT SEGMENT END = .6 SQ.MI.

ELEVATION AT UPSTREAM END = 100 FT
ELEVATION AT DOWNSTREAM END = 65 FT

THE CROSS SECTION IS: IRREGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = Y
THE SEGMENT LENGTH IS 40 % POOLS
POOL DEPTH = .6 FT
THE SEGMENT LENGTH IS 60 % RIFFLES
RIFFLE DEPTH = .08 FT

THE BOTTOM TYPE = SMALL ROCK
SLUDGE DEPOSITS = LIGHT
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

TRIBUTARY DATA
FLOW = 1.81 MGD
BOD5 = 2 MG/L
TKN = 0 MG/L
D.O. = 7.48 MG/L

SEGMENT INFORMAT N

####### SEGMENT # 2 #######

SEGMENT ENDS BECAUSE: A TRIBUTARY ENTERS AT END

SEGMENT LENGTH = .15 MI

SEGMENT WIDTH = 12 FT
SEGMENT DEPTH = .6 FT
SEGMENT VELOCITY = .4 FT/SEC

DRAINAGE AREA AT SEGMENT START = 58.4 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 58.6 SQ.MI.

ELEVATION AT UPSTREAM END = 65 FT
ELEVATION AT DOWNSTREAM END = 60 FT

THE CROSS SECTION IS: WIDE SHALLOW ARC
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = SMALL ROCK
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

TRIBUTARY DATA
FLOW = 631 MGD
BOD5 = 2 MG/L
TKN = 0 MG/L
D.O. = 7.4853 MG/L

SEGMENT INFORMATION

######## SEGMENT # 3 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 5 MI

SEGMENT WIDTH = 480 FT
SEGMENT DEPTH = 4 FT
SEGMENT VELOCITY = .5 FT/SEC

DRAINAGE AREA AT SEGMENT START = 11300 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 11500 SQ.MI.

ELEVATION AT UPSTREAM END = 60 FT
ELEVATION AT DOWNSTREAM END = 40 FT

THE CROSS SECTION IS: WIDE SHALLOW ARC
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = SILT
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = FEW
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

********** ********** **********

REGIONAL MODELING SYSTEM VERSION 3.2

****

MODEL SIMULATION FOR THE The Maderia School DISCHARGE

TO Difficult Run, UT

THE SIMULATION STARTS AT THE The Maderia School DISCHARGE

********** PROPOSED PERMIT LIMITS **********

FLOW = .0495 MGD cBOD5 = 30 Mg/L TKN = 3.75 Mg/L D.O. = 6 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.011 Mg/L ****

THE SECTION BEING MODELED IS BROKEN INTO 3 SEGMENTS
RESULTS WILL BE GIVEN AT 0.1 MILE INTERVALS

********** BACKGROUND CONDITIONS **********

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 0.00000 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 7.475 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

********** MODEL PARAMETERS **********

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. °C	DO-SAT Mg/L
1	0.10	0.971	20.000	1.800	0.350	0.000	100.00	25.00	8.306
2	0.30	0.369	20.000	1.300	0.150	0.000	65.00	25.00	8.316
3	5.00	0.525	1.200	1.500	0.250	0.000	55.00	25.00	8.319

(The K Rates shown are at 20°C ... the model corrects them for temperature.)

PROPOSED PERMIT LIMITS:

TKN OF 3.0 MG/L MINIMUM + 50% OF MONTHLY AVERAGE AMMONIA LIMITATION OF 1.5 MG/L. 50% = 0.75 MG/L

THEREFORE, PROPOSED TKN = 3.0 MG/L + 0.75 MG/L, OR

3.75 MG/L TKN

ATTACHMENT #13

********** RESPONSE FOR SEGMENT 1 **********

TOTAL STREAMFLOW = 0.0495 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	6.000	75.000	3.247
0.100	0.100	5.306	73.939	3.237

FOR THE TRIBUTARY AT THE END OF SEGMENT 1
FLOW = 1.9 MGD cBOD5 = 2 Mg/L TKN = 0 Mg/L D.O. = 7.4754 Mg/L

FLOW FROM INCREMENTAL DRAINAGE AREA = 0.0081 MGD

********** RESPONSE FOR SEGMENT 2 **********

TOTAL STREAMFLOW = 1.9576 MGD
(Including Discharge, Tributaries and Incremental D.A. Flow)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.100	7.420	6.743	0.082
0.100	0.200	7.485	6.563	0.082
0.200	0.300	7.485	6.387	0.081
0.300	0.400	7.485	6.217	0.081

FOR THE TRIBUTARY AT THE END OF SEGMENT 2
FLOW = 410 MGD cBOD5 = 2 Mg/L TKN = 0 Mg/L D.O. = 7.4846 Mg/L

FLOW FROM INCREMENTAL DRAINAGE AREA = 0.0588 MGD

********** RESPONSE FOR SEGMENT 3 **********

TOTAL STREAMFLOW = 412.0164 MGD
(Including Discharge, Tributaries and Incremental D.A. Flow)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.400	7.485	5.006	0.000
0.100	0.500	7.390	5.000	0.000
0.200	0.600	7.404	5.000	0.000
0.300	0.700	7.419	5.000	0.000
0.400	0.800	7.433	5.000	0.000
0.500	0.900	7.446	5.000	0.000
0.600	1.000	7.460	5.000	0.000
0.700	1.100	7.473	5.000	0.000
0.800	1.200	7.487	5.000	0.000
0.900	1.300	7.487	5.000	0.000
1.000	1.400	7.487	5.000	0.000
1.100	1.500	7.487	5.000	0.000
1.200	1.600	7.487	5.000	0.000
1.300	1.700	7.487	5.000	0.000
1.400	1.800	7.487	5.000	0.000
1.500	1.900	7.487	5.000	0.000
1.600	2.000	7.487	5.000	0.000
1.700	2.100	7.487	5.000	0.000
1.800	2.200	7.487	5.000	0.000
1.900	2.300	7.487	5.000	0.000
2.000	2.400	7.487	5.000	0.000
2.100	2.500	7.487	5.000	0.000
2.200	2.600	7.487	5.000	0.000
2.300	2.700	7.487	5.000	0.000
2.400	2.800	7.487	5.000	0.000
2.500	2.900	7.487	5.000	0.000
2.600	3.000	7.487	5.000	0.000
2.700	3.100	7.487	5.000	0.000
2.800	3.200	7.487	5.000	0.000
2.900	3.300	7.487	5.000	0.000
3.000	3.400	7.487	5.000	0.000
3.100	3.500	7.487	5.000	0.000
3.200	3.600	7.487	5.000	0.000
3.300	3.700	7.487	5.000	0.000
3.400	3.800	7.487	5.000	0.000
3.500	3.900	7.487	5.000	0.000
3.600	4.000	7.487	5.000	0.000
3.700	4.100	7.487	5.000	0.000
3.800	4.200	7.487	5.000	0.000
3.900	4.300	7.487	5.000	0.000
4.000	4.400	7.487	5.000	0.000
4.100	4.500	7.487	5.000	0.000
4.200	4.600	7.487	5.000	0.000
4.300	4.700	7.487	5.000	0.000
4.400	4.800	7.487	5.000	0.000
4.500	4.900	7.487	5.000	0.000
4.600	5.000	7.487	5.000	0.000
4.700	5.100	7.487	5.000	0.000

4.800	5.200	7.487	5.000	0.000
4.900	5.300	7.487	5.000	0.000
5.000	5.400	7.487	5.000	0.000

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
03-11-1998 14:32:49

DATA FILE = MAD3.MOD

****

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

****

THE NAME OF THE DATA FILE IS: MAD3.MOD

THE STREAM NAME IS: Difficult Run, UT
THE RIVER BASIN IS: Potomac
THE SECTION NUMBER IS: 8
THE CLASSIFICATION IS: III

STANDARDS VIOLATED (Y/N) = N
STANDARDS APPROPRIATE (Y/N) = Y

DISCHARGE WITHIN 3 MILES (Y/N) = N

THE DISCHARGE BEING MODELED IS: The Maderia School

PROPOSED LIMITS ARE:
FLOW = .0495 MGD
BOD5 = 30 MG/L
TKN = 3.75 MG/L
D.O. = 6 MG/L

THE NUMBER OF SEGMENTS TO BE MODELED = 3

7Q10 WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
THE GAUGE NAME IS: Difficult Run
GAUGE DRAINAGE AREA = 57.9 SQ.MI.
GAUGE 7Q10 = 1.87 MGD
DRAINAGE AREA AT DISCHARGE = .75 SQ.MI.

STREAM A DRY DITCH AT DISCHARGE (Y/N) = Y
ANTIDEGRADATION APPLIES (Y/N) = Y

ALLOCATION DESIGN TEMPERATURE = 25 °C

SEGMENT INFORMATION

####### SEGMENT # 1 #######

SEGMENT ENDS BECAUSE: A TRIBUTARY ENTERS AT END

SEGMENT LENGTH = .1 MI

SEGMENT WIDTH = ..5 FT
SEGMENT DEPTH = .2 FT
SEGMENT VELOCITY = .8 FT/SEC

DRAINAGE AREA AT SEGMENT START = .75 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 1 SQ.MI.

ELEVATION AT UPSTREAM END = 130 FT
ELEVATION AT DOWNSTREAM END = 70 FT

THE CROSS SECTION IS: IRREGULAR
THE CHANNEL IS: MOSTLY STRAIGHT

POOLS AND RIFFLES (Y/N) = Y
THE SEGMENT LENGTH IS 0 % POOLS
POOL DEPTH = 0 FT
THE SEGMENT LENGTH IS 100 % RIFFLES
RIFFLE DEPTH = .2 FT

THE BOTTOM TYPE = LARGE ROCK
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

TRIBUTARY DATA
FLOW = 1.9 MGD
BOD5 = 2 MG/L
TKN = 0 MG/L
D.O. = 7.4754 MG/L

SEGMENT INFORMATION

####### SEGMENT # 2 #######

SEGMENT ENDS BECAUSE: A TRIBUTARY ENTERS AT END

SEGMENT LENGTH = .3 MI

SEGMENT WIDTH = 20 FT
SEGMENT DEPTH = .5 FT
SEGMENT VELOCITY = .3 FT/SEC

DRAINAGE AREA AT SEGMENT START = 58.18 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 60 SQ.MI.

ELEVATION AT UPSTREAM END = 70 FT
ELEVATION AT DOWNSTREAM END = 60 FT

THE CROSS SECTION IS: WIDE SHALLOW ARC
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = Y
THE SEGMENT LENGTH IS 50 % POOLS
POOL DEPTH = .75 FT
THE SEGMENT LENGTH IS 50 % RIFFLES
RIFFLE DEPTH = .25 FT

THE BOTTOM TYPE = LARGE ROCK
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

TRIBUTARY DATA
FLOW = 410 MGD
BOD5 = 2 MG/L
TKN = 0 MG/L
D.O. = 7.4846 MG/L

SEGMENT INFORMATION

####### SEGMENT # 3 #######

SEGMENT ENDS BECAUSE: THE MODEL ENDS

SEGMENT LENGTH = 5 MI

SEGMENT WIDTH = 300 FT
SEGMENT DEPTH = 4 FT
SEGMENT VELOCITY = .5 FT/SEC

DRAINAGE AREA AT SEGMENT START = 11494 SQ.MI.
DRAINAGE AREA AT SEGMENT END = 11560 SQ.MI.

ELEVATION AT UPSTREAM END = 60 FT
ELEVATION AT DOWNSTREAM END = 50 FT

THE CROSS SECTION IS: RECTANGULAR
THE CHANNEL IS: MODERATELY MEANDERING

POOLS AND RIFFLES (Y/N) = N

THE BOTTOM TYPE = SMALL ROCK
SLUDGE DEPOSITS = NONE
AQUATIC PLANTS = NONE
ALGAE OBSERVED = NONE
WATER COLORED GREEN (Y/N) = N

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
03-11-1998 14:32:52

STREAM INSPECTION REPORT FORM

Discharge Name: MADERIA SCHOOL

Location: 8328 GEORGETOWN PIKE

General Stream Information:

Stream Name: DIFFICULT RUN, UT

Topographic Map (attach copy): _____

Basin: POT Section: 8 Class: III Special Standards: NONE

Are the standards for this stream violated due to natural causes? (Y/N) N

Is this stream correctly classified? (Y/N) Y

If "N", what is the correct classification? -

Additional Discharges Information:

Is there a discharger within 3 miles upstream of the proposal? (Y/N) N

Does antidegradation apply to this analysis? (Y/N) N* (WAS NOT APPLIED IN 4/8/92 MODEL) IN FIRST SEGMENT

Any dams in stream section being modeled? (Y/N) N

Notes:

Inspected by AJL + LAK Date 10/15/97 Region NRO

MADERIA SC

STREAM INSPECTION REPORT FORM

OUTFALL 001 TO DIFFICULT RUN

(Fill In This Page for Each Segment to be Modeled)

Specific Stream Information From Field Inspection: Segment Number 1

Reason form Defining Segment: Tributary at End ✓ Physical Change at End ____
Discharge at End ____ End of Model ____

Length of Segment (mi.) 0.1

Estimated Average Width of Section (ft.) 0.5

Estimated Average Depth of Section (ft.) in Stream Center 0.2

Estimated Average Velocity of Section (ft/sec) 0.8

Estimated Flow in the Segment (MGD) .0496

General Type of Cross Section in Segment: Rectangular ____ Triangular ____ Deep Narrow U ____ Wide Shallow Arc ____ Irregular ✓ No Defined Channel ____

General Channel Characteristics of Segment:
Mostly Straight ✓ Moderately Meandering ____ Severely Meandering ____ No Defined Channel ____

Does the stream have a pool and riffle character? (Y/N) Y
If "Y" % of length that is pools ____ Average depth of pools (ft) ____
% of length that is riffles 100% Average depth of riffles (ft) 0.2

Bottom: Sand ____ Slit ____ Gravel ____ Small Rock ____ Large Rock ✓ 50% Boulders ✓ 50%

Sludge Deposits: None ✓ Trace ____ Light ____ Heavy ____

Plants: Rooted: None ✓ Trace ____ Light ____ Heavy ____

Algae: None ✓ Film on Edges Only ____ Film on Entire Bottom ____

Does the water have an evident green color? (Y/N) N

Tributary: (Fill in if a tributary enters at the end of the segment)

Tributary Name: DIFFICULT RUN

Width (ft) 20' Depth (ft) 0.5 Estimated Flow (MGD) 1.9

Any evident Water Quality problems in the Trib.? (Y/N) N

If "Y", explain: ____

Discharges: (Fill in if a discharge enters at the end of the segment)

Discharge Name: N/A

Any evident problems caused by this discharge? (Y/N) ____

If "Y", explain: ____

MADEIRA SC

DATA PREPARATION WORKSHEET

OUTFALL 001 TO DIFFICULT RUN SEG #1

(This Page is needed for Each Separate Segment being Modeled)

The first segment starts at the discharge being modeled and segment ends are defined according to the field inspection. Normally a distance of 3 to 5 miles is sufficient for a single discharge model. Dilution by a major tributary is often sufficient to allow the model to be ended. You should, however, inspect sufficient stream length to allow you to increase the number of segments or total model length if the model shows that the critical area is outside your initial estimates. This will allow the addition of segments and the preparation of a new data set without the necessity to reinspect the stream. As a general guideline, the higher the percentage the discharge is of the total stream. As a general guideline, the higher the percentage the discharge is of the total stream flow the longer the distance you will have to model. Ten miles should suffice for practically all situations.

Segment Definition Code: 1

Reasons for Defining a Segment:
- 1 = A Tributary Enters at the Segment End
- 2 = A Significant Physical Change Occurs at Segment End
- 3 = Another Discharge Enters at Segment End
- 4 = The Model Ends

Length of Segment (Mi.): 0.1

Based on the stream characteristics you observed, use your judgement and the flow ratio below to estimate the segment's physical characteristics at the 7Q10 flow condition. Note that the model checks to see if cross sectional area times velocity is equal to the flow (V=QA). It checks to see if the drainage are increases in the downstream direction. You will run into trouble if the estimates you make are unreasonable.

(a): Enter Flow Estimated During Inspection (MGD): .0496

(b): Enter 7Q10 at Model Start <Include Discharge> (MGD):

(c): Calculate the Flow Ratio (a/b):

Estimated 7Q10 Width (Ft.): .5

Estimated 7Q10 Depth (Ft.): .2

Estimated 7Q10 Velocity (Ft./sec.): .8

Continuity Check:

(a): Multiply: Width x Depth x Velocity x .6463: .051704

(b): Enter 7Q10 at Model Start <Include Discharge> (MGD): .0496

If the two numbers above differ by such, you have made some sort of error. Review your data and revise you estimates.

Drainage Area at the Beginning of This Segment (Sq.Mi.): 0.75

Drainage Area at the End of This Segment (Sq.Mi.): 1.0

(Omit the drainage area of any tributaries that are included in this segment under the "Tributary at End" section below).

Elevation at the Beginning of This Segment (Ft.): 130

Elevation at the End of This Segment (Ft.): 70

The following data is based on the field inspection and you should estimate what the overall "average" segment will look like at the 7Q flow condition. You enter the number code that best describes what you saw for this segment.

Type of Cross Section: 5

1 = Rectangular; 2 = Triangular; 3 = Deep Narrow U; 4 = Wide Shallow Arc; 5 = Irregular; 6 = No Defined Channel

MADERIA SC

STREAM INSPECTION REPORT FORM DIFFICULT RUN TO POTOMAC RIVER

(Fill In This Page for Each Segment to be Modeled)

Specific Stream Information From Field Inspection: Segment Number 2

Reason form Defining Segment: Tributary at End ✓ Physical Change at End ____
Discharge at End ____ End of Model ____

Length of Segment (mi.) 0.3

Estimated Average Width of Section (ft.) 20.

Estimated Average Depth of Section (ft.) in Stream Center 0.5

Estimated Average Velocity of Section (ft/sec) 0.3

Estimated Flow in the Segment (MGD) 1.9

General Type of Cross Section in Segment: Rectangular ____ Triangular ____ Deep Narrow U ____ Wide Shallow Arc ✓
Irregular ____ No Defined Channel ____

General Channel Characteristics of Segment:
Mostly Straight ____ Moderately Meandering ✓ Severely Meandering ____ No Defined Channel ____

Does the stream have a pool and riffle character? (Y/N) Y
If "Y" % of length that is pools 50 Average depth of pools (ft) .75
% of length that is riffles 50 Average depth of riffles (ft) .25

Bottom: Sand ____ Slit ____ Gravel ____ Small Rock ____ Large Rock ✓ Boulders ____

Sludge Deposits: None ✓ Trace ____ Light ____ Heavy ____

Plants: Rooted: None ✓ Trace ____ Light ____ Heavy ____

Algae: None ✓ Film on Edges Only ____ Film on Entire Bottom ____

Does the water have an evident green color? (Y/N) N

Tributary: (Fill in if a tributary enters at the end of the segment)

Tributary Name: POTOMAC RIVER

Width (ft) 300 Depth (ft) 4 Estimated Flow (MGD) 410

Any evident Water Quality problems in the Trib.? (Y/N) N

If "Y", explain: ____

Discharges: (Fill in if a discharge enters at the end of the segment)

Discharge Name: N/A

Any evident problems caused by this discharge? (Y/N) ____

If "Y", explain: ____

DATA PREPARATION WORKSHEET

DIFFICULT RUN TO POTOMAC RIVER SEG #2

(This Page is needed for Each Separate Segment being Modeled)

The first segment starts at the discharge being modeled and segment ends are defined according to the field inspection. Normally a distance of 3 to 5 miles is sufficient for a single discharge model. Dilution by a major tributary is often sufficient to allow the model to be ended. You should, however, inspect sufficient stream length to allow you to increase the number of segments or total model length if the model shows that the critical area is outside your initial estimates. This will allow the addition of segments and the preparation of a new data set without the necessity to reinspect the stream. As a general guideline, the higher the percentage the discharge is of the total stream. As a general guideline, the higher the percentage the discharge is of the total stream flow the longer the distance you will have to model. Ten miles should suffice for practically all situations.

Segment Definition Code: 1

Reasons for Defining a Segment:
- 1 = A Tributary Enters at the Segment End
- 2 = A Significant Physical Change Occurs at Segment End
- 3 = Another Discharge Enters at Segment End
- 4 = The Model Ends

Length of Segment (Mi.): 0.3

Based on the stream characteristics you observed, use your judgement and the flow ratio below to estimate the segment's physical characteristics at the 7Q10 flow condition. Note that the model checks to see if cross sectional area times velocity is equal to the flow (V=QA). It checks to see if the drainage are increases in the downstream direction. You will run into trouble if the estimates you make are unreasonable.

(a): Enter Flow Estimated During Inspection (MGD): 1.9

(b): Enter 7Q10 at Model Start <Include Discharge> (MGD):

(c): Calculate the Flow Ratio (a/b):

Estimated 7Q10 Width (Ft.): 20

Estimated 7Q10 Depth (Ft.): .5

Estimated 7Q10 Velocity (Ft./sec.): .3

Continuity Check:

(a): Multiply: Width x Depth x Velocity x .6463: 1.9389

(b): Enter 7Q10 at Model Start <Include Discharge> (MGD): 1.9

If the two numbers above differ by such, you have made some sort of error. Review your data and revise you estimates.

Drainage Area at the Beginning of This Segment (Sq.Mi.): 58.18

Drainage Area at the End of This Segment (Sq.Mi.): 60

(Omit the drainage area of any tributaries that are included in this segment under the "Tributary at End" section below).

Elevation at the Beginning of This Segment (Ft.): 70

Elevation at the End of This Segment (Ft.): 60

The following data is based on the field inspection and you should estimate what the overall "average" segment will look like at the 7Q flow condition. You enter the number code that best describes what you saw for this segment.

Type of Cross Section: 4

1 = Rectangular; 2 = Triangular; 3 = Deep Narrow U; 4 = Wide Shallow Arc; 5 = Irregular; 6 = No Defined Channel

MADERIA SC

STREAM INSPECTION REPORT FORM

(Fill In This Page for Each Segment to be Modeled)

Specific Stream Information From Field Inspection: Segment Number 3 POTOMAC RIVER 5 MI

Reason form Defining Segment: Tributary at End ____ Physical Change at End ____
Discharge at End ____ End of Model ✓

Length of Segment (mi.) 5

Estimated Average Width of Section (ft.) 300

Estimated Average Depth of Section (ft.) in Stream Center 4 (BOTTOM OF GREAT FALLS)

Estimated Average Velocity of Section (ft/sec) .55

Estimated Flow in the Segment (MGD) 410

General Type of Cross Section in Segment: Rectangular ✓ Triangular ____ Deep Narrow U ____ Wide Shallow Arc ____ Irregular ____ No Defined Channel ____

General Channel Characteristics of Segment:
Mostly Straight ____ Moderately Meandering ✓ Severely Meandering ____ No Defined Channel ____

Does the stream have a pool and riffle character? (Y/N) N
If "Y" % of length that is pools — Average depth of pools (ft) —
% of length that is riffles — Average depth of riffles (ft) —

Bottom: Sand ____ Slit ____ Gravel ____ Small Rock ✓ Large Rock ____ Boulders ____

Sludge Deposits: None ✓ Trace ____ Light ____ Heavy ____

Plants: Rooted: None ✓ Trace ____ Light ____ Heavy ____

Algae: None ✓ Film on Edges Only ____ Film on Entire Bottom ____

Does the water have an evident green color? (Y/N) N

Tributary: (Fill in if a tributary enters at the end of the segment)

Tributary Name: N/A

Width (ft) ____ Depth (ft) ____ Estimated Flow (MGD) ____

Any evident Water Quality problems in the Trib.? (Y/N) ____

If "Y", explain: ____

Discharges: (Fill in if a discharge enters at the end of the segment)

Discharge Name: N/A

Any evident problems caused by this discharge? (Y/N) ____

If "Y", explain: ____

REGIONAL MODELING SYSTEM MADERIA SC PAGE 3c

DATA PREPARATION WORKSHEET POTOMAC RIVER 5 MI SEG#3

(This Page is needed for Each Separate Segment being Modeled)

The first segment starts at the discharge being modeled and segment ends are defined according to the field inspection. Normally a distance of 3 to 5 miles is sufficient for a single discharge model. Dilution by a major tributary is often sufficient to allow the model to be ended. You should, however, inspect sufficient stream length to allow you to increase the number of segments or total model length if the model shows that the critical area is outside your initial estimates. This will allow the addition of segments and the preparation of a new data set without the necessity to reinspect the stream. As a general guideline, the higher the percentage the discharge is of the total stream. As a general guideline, the higher the percentage the discharge is of the total stream flow the longer the distance you will have to model. Ten miles should suffice for practically all situations.

Segment Definition Code: 4

Reasons for Defining a Segment:
- 1 = A Tributary Enters at the Segment End
- 2 = A Significant Physical Change Occurs at Segment End
- 3 = Another Discharge Enters at Segment End
- 4 = The Model Ends

Length of Segment (Mi.): 5

Based on the stream characteristics you observed, use your judgement and the flow ratio below to estimate the segment's physical characteristics at the 7Q10 flow condition. Note that the model checks to see if cross sectional area times velocity is equal to the flow (V=QA). It checks to see if the drainage are increases in the downstream direction. You will run into trouble if the estimates you make are unreasonable.

(a): Enter Flow Estimated During Inspection (MGD) 410

(b): Enter 7Q10 at Model Start <Include Discharge> (MGD) _____

(c): Calculate the Flow Ratio (a/b) _____

Estimated 7Q10 Width (Ft.) 300

Estimated 7Q10 Depth (Ft.) 4

Estimated 7Q10 Velocity (Ft./sec.) .55

Continuity Check:

(a): Multiply: Width x Depth x Velocity x .6463 426.56

(b): Enter 7Q10 at Model Start <Include Discharge> (MGD) 410

If the two numbers above differ by such, you have made some sort of error. Review your data and revise you estimates.

Drainage Area at the Beginning of This Segment (Sq.Mi.) 11494

Drainage Area at the End of This Segment (Sq.Mi.) 11560

(Omit the drainage area of any tributaries that are included in this segment under the "Tributary at End" section below).

Elevation at the Beginning of This Segment (Ft.) 60

Elevation at the End of This Segment (Ft.) 50

The following data is based on the field inspection and you should estimate what the overall "average" segment will look like at the 7Q flow condition. You enter the number code that best describes what you saw for this segment.

Type of Cross Section: 1

1 = Rectangular; 2 = Triangular; 3 = Deep Narrow U; 4 = Wide Shallow Arc; 5 = Irregular; 6 = No Defined Channel

DATA PREPARATION WORKSHEET

(This Page is Needed Once for each Model)

Use this form to assist in the preparation of the model input data. The form is arranged so that the data appears in the order needed by the model. Once the form is complete, you may input the data for a model run by simply entering the numbers and other data that you have put in the right hand column. There is some guidance provided here, but for detailed guidance refer to the manual or call headquarters for assistance.

Some of the input data are character, such as names; some are codes, such as "Y", "N" kor "3"; and some are actual numeric data such as "5.6". Be careful to enter the correct item called for. Some of the lines below may be blank depending on choices. Leave them blank and do not input data for blank lines when running the model. Miscellaneous items that are not in the right most column are intermediate guidelines, not input data.

Site Inspection Performed? (Y/N) 10/15/97	Y
Name of Receiving Stream	DIFFICULT RUN, VT
River Basin	POTOMAC
Section	08
Classification	III
Are Standards Violated Due to Natural Causes? (Y/N)	N
Class and Standards Appropriate for the Stream? (Y/N)	Y
Is there a Dam in the Reach to be Modeled? (Y/N)	N
Is There a Discharge Within 3 Miles of Model Start? (Y/N)	N
If "Y": Flow of Upstream Discharge (MGD)	-
BOD5 at Model Start (Mg/1)	-
TKN at Model Start (Mg/1)	-
D.O. at Model Start (Mg/1)	-
Name of Discharge Being Modeled	MADERIA SC
Proposed Flow (MGD)	.0495
Proposed BOD (Mg/1)	30
Proposed TKN (Mg/1)	3.75
Proposed D.O. Start (Mg/1)	6.
Number of Segments to be Modeled (Determined during your field inspection and based on the physical characteristics of the stream of the stream. See "Reason for Defining Segment" on Page 2)	3
7Q Estimation Method Code (Two methods are provided: 1 = Drainage Area Comparison; 2 = Flow Comparison You may compare drainage areas or observed flows at the model site with a gauge).	1
Name of Gauge Used to Estimate 7Q10	
If Method 1: Gauge Drainage Area (Sq.Mi.)	57.9
Gauge 7Q10 (MGD)	1.87
Drainage Area at Discharge (Sq.Mi.)	58.18
If Method 2: Gauge 7Q10 (MGD)	-
Observed Flow at Gauge (MGD)	-
Observed Flow at Discharge (Sq.Mi.)	-
Is the Stream a Dry Ditch? (Y/N)	N
Does Antidegradation Apply? (Y/N)	N
Allocation Temperature for the Model (°C) (Obtain a STORET retrieval for the nearest monitoring station to the discharge. Enter the 98th percentile temperature of the STORET data for the period being modeled.)	25

Table 5-1: Difficult Run Wasteload Allocation for VPDES Permitted Facilities for *E. coli* Bacteria					
Permit Number	**Facility Name**	**Facility Type**	**Design Flow (MGD)**	**Effluent Limit (cfu/100ml)**	**Wasteload Allocation (cfu/year)**
VA0024121	The Madeira School	Municipal	0.0495	126	8.62E+10
Existing WLA			0.0495	126	8.62E+10
Future Growth Scenario: 2 x Existing WLA			0.0990	126	1.72E+11
Future Growth Scenario: 5 x Existing WLA*			0.2475	126	4.31E+11

*Future growth scenario used in the TMDL

Benthic TMDL – WLA:

Table 7-1: Point Source Wasteload Allocations for Difficult Run				
Permit No	**Facility Name**	**TSS Load (kg/day)**	**Annual Sediment Loading (ton/year)**	**Percent Reduction**
VA0024121	The Madeira School	5.6	2.25	-
Current Allocated Wasteload for the Point Source			2.25	-
Expansion for Future Growth (5X WLA)			11.3	-
Total Allocated Wasteload for the Point Source			**11.3**	-

PUBLIC NOTICE OF INTENT TO REISSUE A VPDES PERMIT

Citizens may comment on the proposed permit reissuance that allows the release of treated wastewater into a water body in Fairfax County, Virginia

PUBLIC COMMENT PERIOD:

PERMIT NAME: The Maderia School
Virginia Pollutant Discharge Elimination System Permit (VPDES)

Owners or operators of municipal facilities that discharge or propose to discharge wastewater into the streams, rivers or bays of Virginia from a point source must apply for this permit. In general, point sources are fixed sources of pollution such as pipes, ditches or channels. The applicant must submit the application to the Department of Environmental Quality, under the authority of the State Water Control Board.

PURPOSE OF NOTICE: To invite the public to comment on the draft permit.

NAME, ADDRESS AND PERMIT NUMBER OF APPLICANT: The Maderia School
8328 Georgetown Pike
McLean, VA 22102
VA0024121

NAME AND ADDRESS OF FACILITY: The Maderia School STP
8328 Georgetown Pike
McLean, VA 22102

PROJECT DESCRIPTION: The Maderia School has applied for reissuance of a permit for the Maderia School STP in Fairfax County, Virginia. The applicant proposes to release treated sewage at a rate of 0.0495 Million Gallons per Day into an unnamed tributary of Difficult Run in Fairfax County that is in the Potomac River Watershed. A watershed is the land area drained by a river and its incoming streams. The sludge will be transported to another sewage treatment plant for stabilization and disposal. The permit will limit or monitor the following pollutants to amounts that protect water quality: Flow, pH, BOD_5, Total Suspended Solids, Total Phosphorus, *E. Coli* Bacteria, Dissolved Oxygen, Total Nitrogen, Total Kjeldahl Nitrogen, Ammonia as Nitrogen, Nitrite and Nitrate as Nitrogen, Total Residual Chlorine, Total Recoverable Copper, and Oil and Grease. The facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.

HOW A DECISION IS MADE: After public comments have been considered and addressed by the permit or other means, DEQ will make the final decision unless there is a public hearing. DEQ may hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the proposed permit. If there is a public hearing, the State Water Control Board will make the final decision.

HOW TO COMMENT: DEQ accepts comments by e-mail, fax or postal mail. All comments must be in writing and be received by DEQ during the 30 day comment period. The public also may request a public hearing.

WRITTEN COMMENTS MUST INCLUDE:
1. The names, mailing addresses and telephone numbers of the person commenting and of all people represented by the citizen.
2. If a public hearing is requested, the reason for holding a hearing, including associated concerns.
3. A brief, informal statement regarding the extent of the interest of the person commenting, including how the operation of the facility or activity affects the citizen.

TO REVIEW THE DRAFT PERMIT AND APPLICATION: The public may review the draft permit and application at the DEQ office named below or may request a copy by calling or e-mailing the contact individual below.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION:
Name: Anna T. Westernik
Address: DEQ-Northern Virginia Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3837 E-mail: atwesternik@deq.virginia.gov Fax: (703) 583-3841

APPENDIX A
SCHEDULE OF COMPLIANCE

Madeira shall:

1. By January 31, 2006, select a contractor to provide services related to short-term improvements.

2. By August 1, 2006, complete construction related to short-term improvements and submit a request for a Certificate to Operate (CTO) to the DEQ Office of Wastewater Engineering (OWE).

3. By March 1, 2006, select engineering and environmental consulting firms to conduct design and environmental studies related to long-term improvements.

4. By April 1, 2006, begin appropriate studies, which might include an Environmental Impact Study, to determine if connection to Fairfax County is possible, or if onsite wastewater treatment will be required.

5. By March 1, 2007, complete study and submit results and decision to DEQ to either connect to Fairfax County or construct a new treatment plant.

6. By May 1, 2007, begin the project design related to the long-term improvement.

7. By February 1, 2008, submit plans and specifications to OWE for county connection or new plant construction.

8. Within 12 months of the date of DEQ approval of design plans and specifications, identify and secure funding for construction, and notify DEQ that funding has been secured.

9. Within 30 days of Item 8, solicit contractor bid proposals.

10. Within 30 days of Item 9, award the construction contract for treatment plant or sewer line connection to Fairfax County.

11. Within 18 months of the date of DEQ approval of plans and specifications, complete sewer line connection or treatment plant and submit a request for a CTO to OWE.

12. Within 60 days of Item 11, gain full permit compliance.

13. Operate the WWTP in a workman-like manner in order to produce the best quality effluent of which the WWTP is capable during implementation of this schedule.

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	The Maderia School
NPDES Permit Number:	VA00024121
Permit Writer Name:	Anna Westernik
Date:	May 14, 2008

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [x]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	x		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	x		
3. Copy of Public Notice?	x		
4. Complete Fact Sheet?	x		
5. A Priority Pollutant Screening to determine parameters of concern?	x		
6. A Reasonable Potential analysis showing calculated WQBELs?	x		
7. Dissolved Oxygen calculations?		x	
8. Whole Effluent Toxicity Test summary and analysis?		x	
9. Permit Rating Sheet for new or modified industrial facilities?		x	

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		x	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	x		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	x		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?*		x	
5. Has there been any change in streamflow characteristics since the last permit was developed?		x	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		x	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	x		
8. Does the facility discharge to a 303(d) listed water?**		x	
a. Has a TMDL been developed and approved by EPA for the impaired water?			x
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			x
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	x		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		x	
10. Does the permit authorize discharges of storm water?		x	

Attachment 14

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		x	
12. Are there any production-based, technology-based effluent limits in the permit?		x	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		x	
14. Are any WQBELs based on an interpretation of narrative criteria?		x	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		x	
16. Does the permit contain a compliance schedule for any limit or condition?	x		
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?	x		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	x		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		x	
20. Have previous permit, application, and fact sheet been examined?	x		

*Facility will be upgraded during this permit cycle.

** Does not directly discharge in a 303(d) water. However, a TMDL is being prepared for a downstream segment (see attachment).

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs
(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	x		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	x		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	x		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			x

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	x		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	x		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			x
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	x		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	x		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		x	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			x

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	x		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?	x		
3. Does the fact sheet provide effluent characteristics for each outfall?	x		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	x		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	x		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	x		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	x		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?		x	
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	x		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	x		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	x		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	x		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	x		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	x		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	x		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?	x		
4. Does the permit require testing for Whole Effluent Toxicity?		x	

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	x		
2. Does the permit include appropriate storm water program requirements?			x

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?	x		
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			x
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		x	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?			x
a. Does the permit require implementation of the "Nine Minimum Controls"?			x
b. Does the permit require development and implementation of a "Long Term Control Plan"?			x
c. Does the permit require monitoring and reporting for CSO events?			x
7. Does the permit include appropriate Pretreatment Program requirements?			x

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	x		

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?			

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Review Checklist – For Non-Municipals

(To be completed and included in the record for all non-POTWs)

II.A. Permit Cover Page/Administration	**Yes**	**No**	**N/A**
1. Does the fact sheet **or** permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?			
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?			

II.B. Effluent Limits – General Elements	**Yes**	**No**	**N/A**
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?			
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ)	**Yes**	**No**	**N/A**
1. Is the facility subject to a national effluent limitations guideline (ELG)?			
a. If yes, does the record adequately document the categorization process, including an evaluation of whether the facility is a new source or an existing source?			
b. If no, does the record indicate that a technology-based analysis based on Best Professional Judgement (BPJ) was used for all pollutants of concern discharged at treatable concentrations?			
2. For all limits developed based on BPJ, does the record indicate that the limits are consistent with the criteria established at 40 CFR 125.3(d)?			
3. Does the fact sheet adequately document the calculations used to develop both ELG and /or BPJ technology-based effluent limits?			
4. For all limits that are based on production or flow, does the record indicate that the calculations are based on a "reasonable measure of ACTUAL production" for the facility (not design)?			
5. Does the permit contain "tiered" limits that reflect projected increases in production or flow?			
a. If yes, does the permit require the facility to notify the permitting authority when alternate levels of production or flow are attained?			
6. Are technology-based permit limits expressed in appropriate units of measure (e.g., concentration, mass, SU)?			
7. Are all technology-based limits expressed in terms of both maximum daily, weekly average, and/or monthly average limits?			
8. Are any final limits less stringent than required by applicable effluent limitations guidelines or BPJ?			

II.D. Water Quality-Based Effluent Limits	**Yes**	**No**	**N/A**
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?			
2. Does the record indicate that any WQBELs were derived from a completed and EPA approved TMDL?			
3. Does the fact sheet provide effluent characteristics for each outfall?			
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?			
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?			
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?			

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?			
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations where data are available)?			
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?			
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?			
6. For all final WQBELs, are BOTH long-term (e.g., average monthly) AND short-term (e.g., maximum daily, weekly average, instantaneous) effluent limits established?			
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?			
8. Does the fact sheet indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?			

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters?			
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?			
3. Does the permit require testing for Whole Effluent Toxicity in accordance with the State's standard practices?			

II.F. Special Conditions	Yes	No	N/A
1. Does the permit require development and implementation of a Best Management Practices (BMP) plan or site-specific BMPs?			
a. If yes, does the permit adequately incorporate and require compliance with the BMPs?			
2. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			
3. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?			

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
Duty to mitigate	Monitoring and records	Transfers
Proper O & M	Signatory requirement	Monitoring reports
Permit actions	Bypass	Compliance schedules
	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for existing non-municipal dischargers regarding pollutant notification levels [40 CFR 122.42(a)]?			

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Anna Westernik
Title	Environmental Specialist II
Signature	
Date	May 14, 2008